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August, 1941

TECHNOLOGY DEPT.

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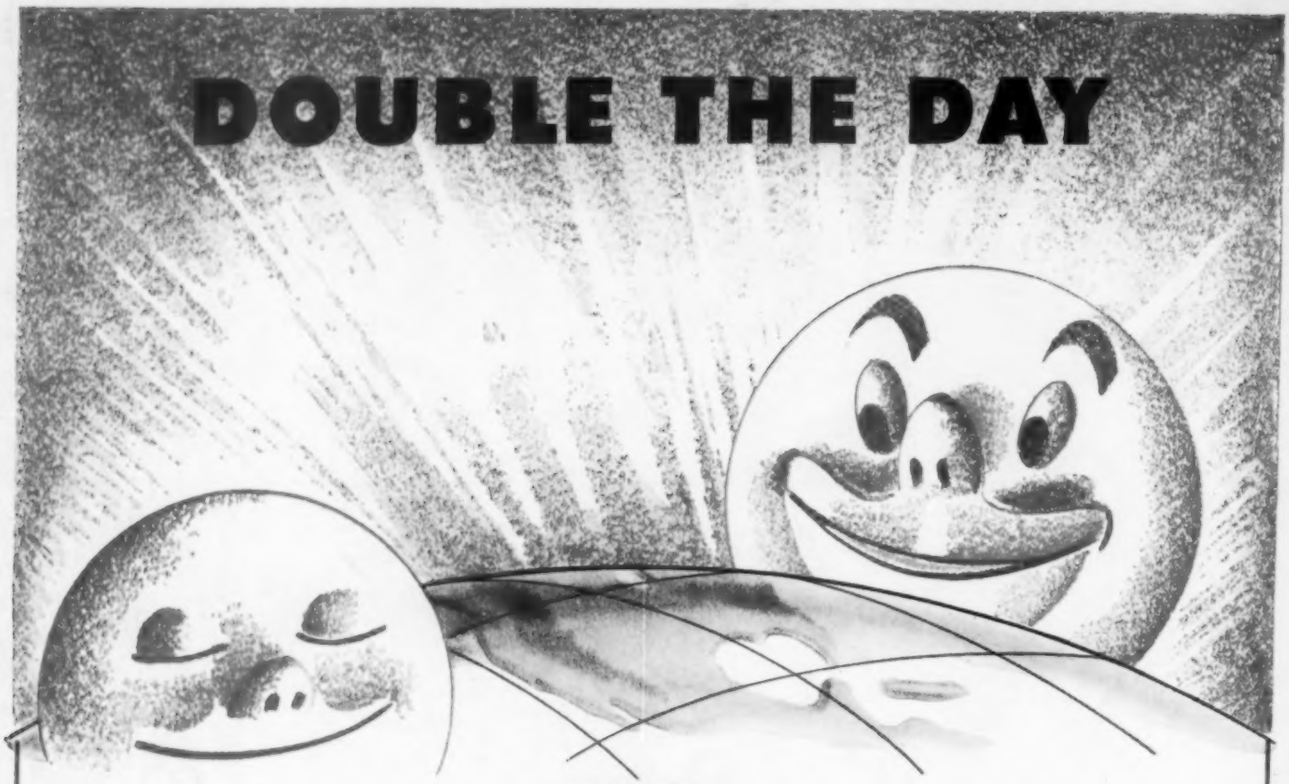

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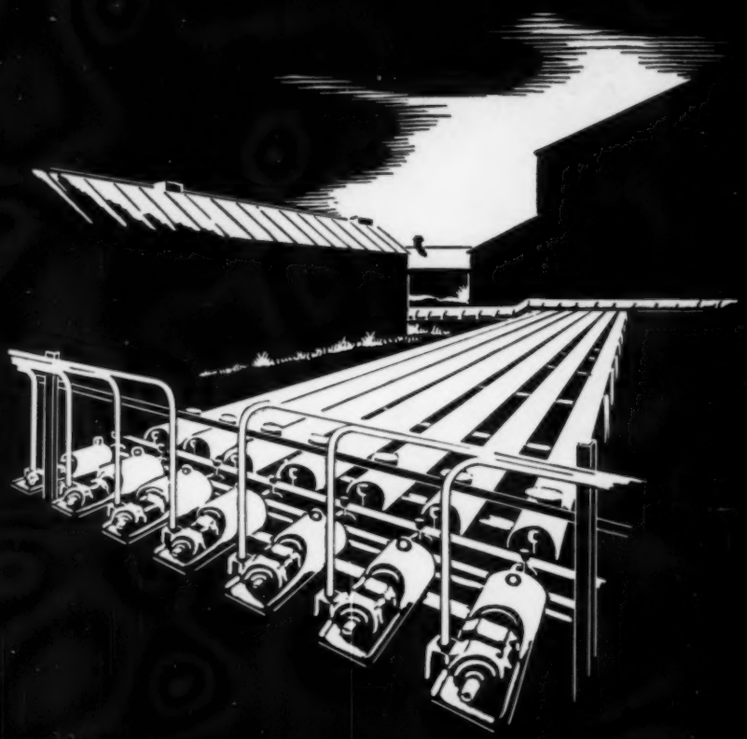
THE RUBBER AGE, published monthly by The Palmerton Publishing Co., Inc., Printing Office, East Stroudsburg, Pa. Editorial and Advertising Offices at 250 West 57th Street, New York, N. Y. Entered as second class matter October 20, 1933, at the Post Office at East Stroudsburg, Pa., under the Act of March 3, 1879. Subscription in United States, $2.00 a year. Canada, $2.50; Foreign, $3.00. August, 1941. Vol. 49, No. 5.



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Continental

BIBLIOGRAPHY OF RUBBER LITERATURE for Years 1935—1939

Compiled by **D. E. CABLE, Ph.D., Ch.E.**

•

This bibliography is the only book of its kind available in the rubber industry. Its primary object is to assemble all rubber references, stripped of abstracts or annotations, but giving sufficient directions to permit the reader to locate the original articles (and translations and reprints) or alternatively one or more abstracts of those articles.

In other words this bibliography serves as the "clearing house" for all published information on every branch of rubber technology, manufacturing processes, cultivation, machinery and equipment, new rubber articles, latest compounding materials, etc.

The subject matter is divided into separate appropriate classifications, supplemented by complete author and subject indexes which make it a simple matter to locate any single article or all that has been published on any particular subject.

The Bibliography of Rubber Literature was first brought out in 1936 covering the year 1935; the second issue, covering 1936, was included as a section of the 1937 Rubber Red Book and is now available as a separate cloth bound volume; the third issue, covering 1937, was issued in 1938. The fourth volume, covering 1938 and 1939, is a volume of over 250 pages and follows the same satisfactory style of previous issues. This edition inaugurates the issuance of the bibliography as a biennial. It will hereafter appear every other year and will cover the literature of the previous two years.

A complete set of Cable's "Bibliography of Rubber Literature" is indispensable to rubber libraries, chemists, physicists, engineers and all others desiring to keep posted on rubber developments throughout the world.

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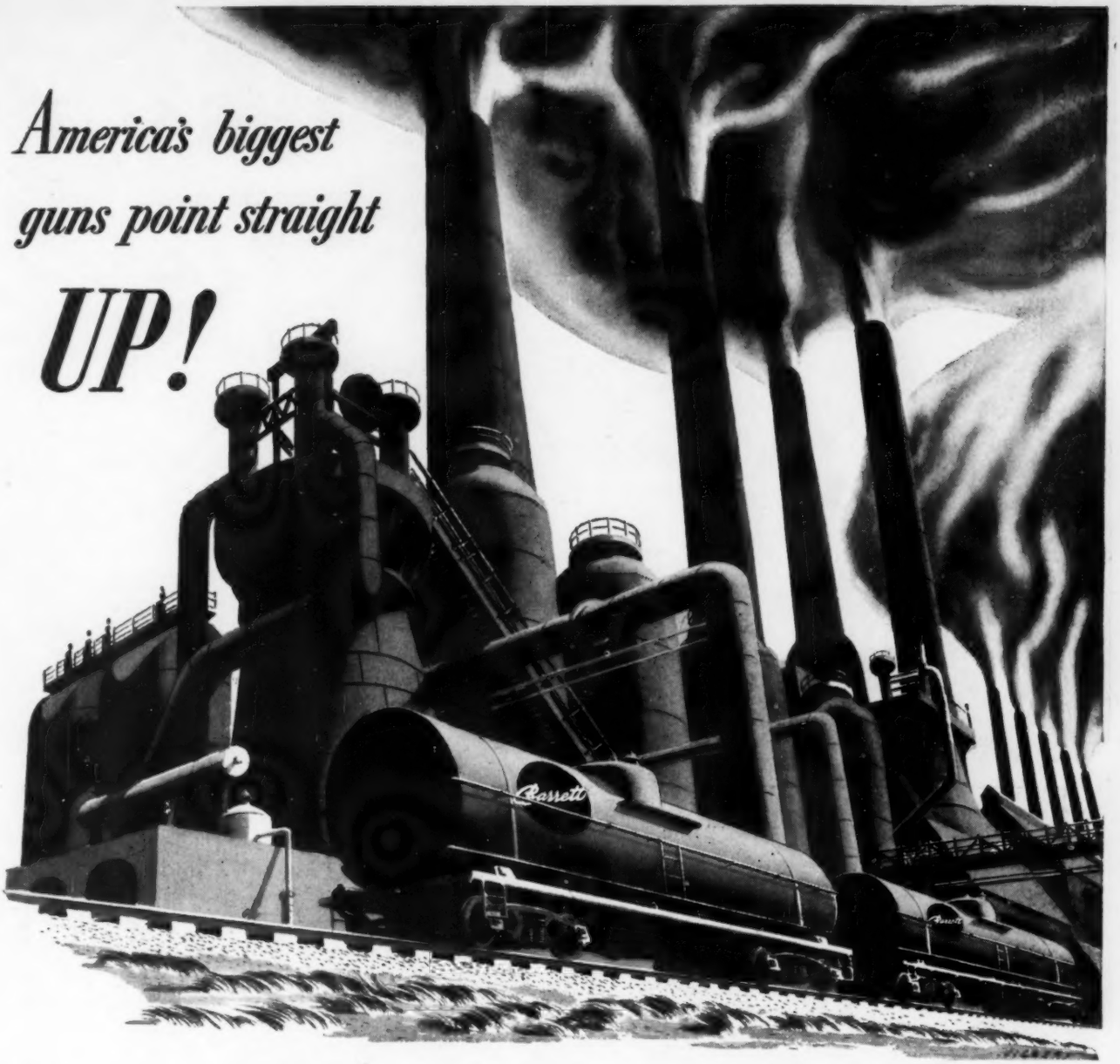

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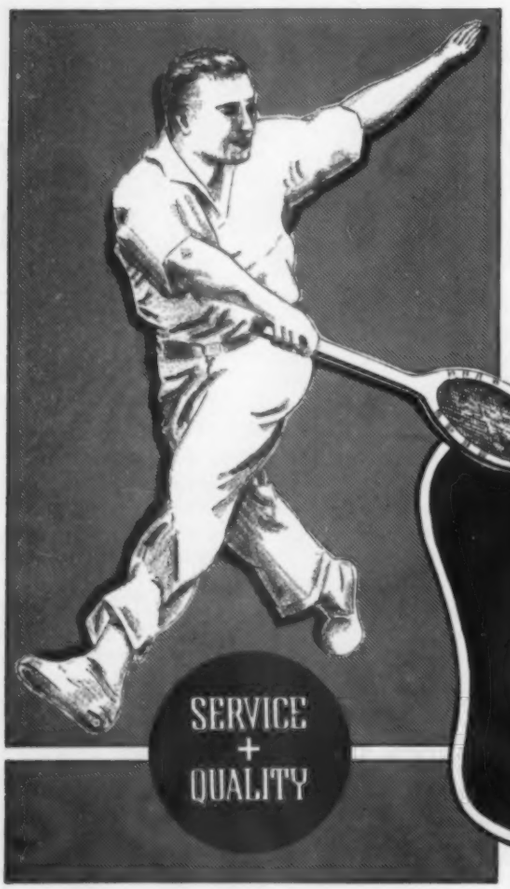

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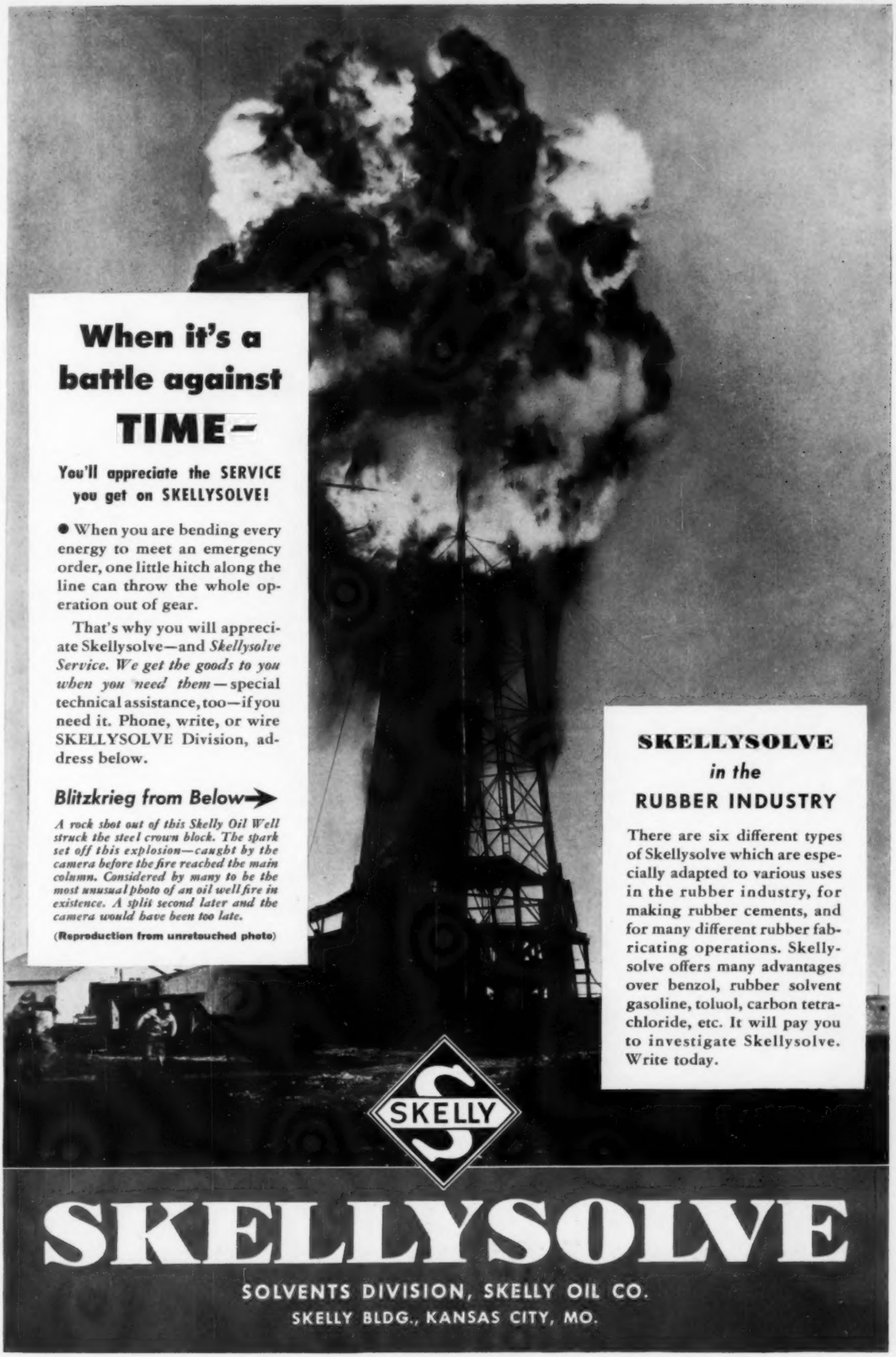

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An example of the thoroughness with which we have tackled this new edition may be seen in the fact that in the Who's Who Section alone there was a turnover of more than 3,000 names! All of this means a tremendous amount of detail work—but it is all necessary in order to insure the accuracy and completeness which we demand.

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RUBBER RED BOOK
Directory of the Rubber Industry

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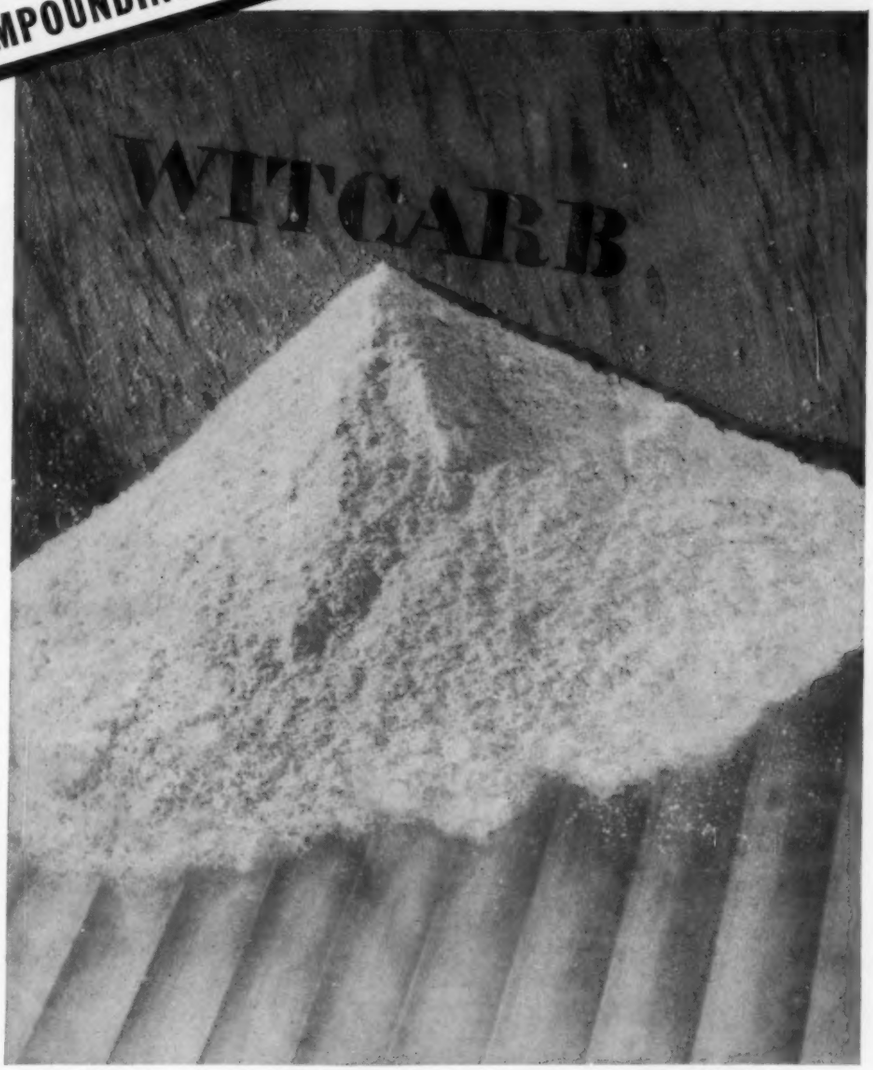

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Based on 1940 figures this indicates up to 34,000,000 lbs. more tire scrap per year —a saving substantiated by many months of use in the reclaiming plant of B. F. Goodrich Co., in Akron. ***(See copy of letter herewith)*** →

Copy of letter, dated June 20, 1941 from T. G. Graham, *Vice-President of* B. F. Goodrich Co., Akron, Ohio.

Mr. G. L. Hammond, President
The Black Rock Mfg. Company
Bridgeport, Connecticut

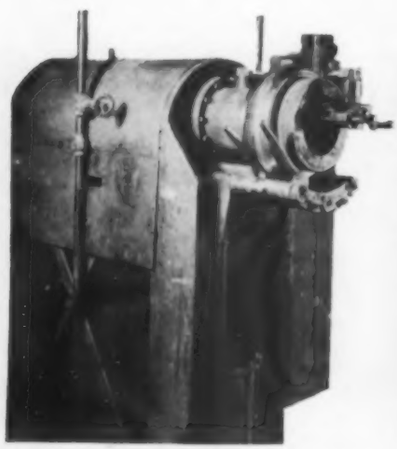
Dear Mr. Hammond:

In 1940 the reclaim industry in the United States used approximately 340,000,000 lbs. of whole tire scrap. It is estimated that this represents about one-third of the used tires that were discarded throughout the Year 1940.

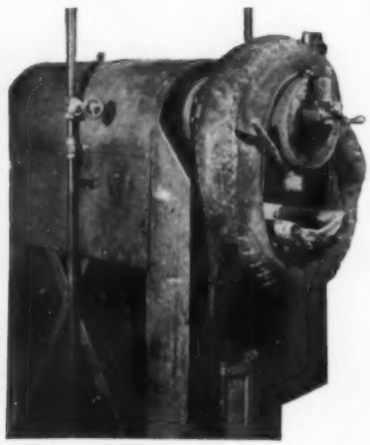
The present or conventional method of debeading whole tires show a loss of 12% to 18%, or in pounds of somewhere between 41,000,000 and 55,000,000 pounds for the Year 1940.

The B. F. Goodrich debeading method, which is in use in our Akron reclaim plant, demonstrates that a shrinkage of not over 6¼% is possible. This means that the Goodrich method would increase the yield on the whole tire scrap poundage for 1940 somewhere between 20,000,000 and 34,000,000 pounds and in dollar value, with whole tire scrap at $21.50 per ton, represents the elimination of an economic waste of approximately $250,000 per year.

THE UNIT OF TWO MACHINES—
with method of operation is shown below



1 DS-1 shows the cutter ready to receive a tire. Both knives are clearly shown and the tensioning device all the way up.



2 DS-2 shows the same machine with tire tensioned and cutting of the beads nearly finished.

These machines—made by Black Rock—will effect a saving of approximately 60% of bead section scrap as well as a material saving in time and labor. Proven by months of actual use in production.

"Black Rock Debeader, Licensed by the B. F. Goodrich Company under C. W. Leguillon Patent No. 2,230,302."

Write Now for Details

3 DP-4 shows the puller and one hook pulling both beads and the other hook coming down ready for operation on the tire in the foreground.

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VOLUME 49
NUMBER 5

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Directory of the Rubber Industry
Published Biennially

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Compiled by D. E. Cable, Ph.D.
First issue covers year 1935

LATEX IN INDUSTRY
By Royce J. Noble, Ph.D.
Text Book on Latex

LATEX AND ITS INDUSTRIAL APPLICATIONS (Vol. I)
By Frederick Marchionna
Bibliography of latex patents and literature to June, 1932.

LATEX AND RUBBER DERIVATIVES AND THEIR INDUSTRIAL APPLICATIONS (Vols. II & III)
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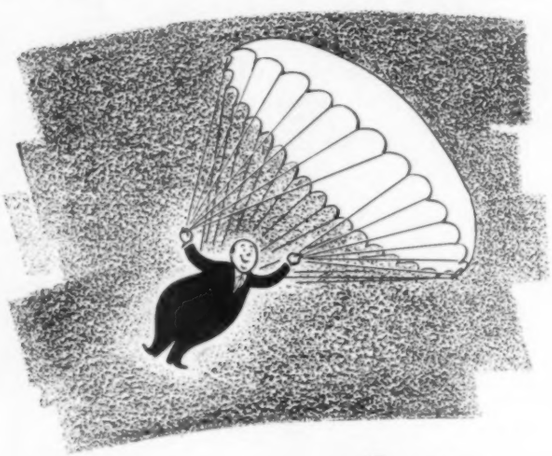

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The **RUBBER AGE**

VOL. 49. No. 5 **AUGUST, 1941**

Thermosetting Plastic Materials

No. 1 of a Series of 4 Articles on PLASTICS

By J. DELMONTE

Technical Director,
Plastics Industries Technical Institute,
Los Angeles, California

The gap between the rubber and plastics industries grows smaller with new developments. Many rubber manufacturers are giving serious consideration to expanding their manufacturing activities to embrace the production of truly plastic products. For this reason we have asked Mr. Delmonte to prepare a series of articles for us covering the fundamentals of plastics, emphasizing wherever possible the relationship between rubber and plastics. This series will consist of four articles. The first, presented herewith, covers thermosetting plastic materials. The next will touch on the thermoplastic materials. The final two articles will treat with the problems of molding.—Editor.

RECENT developments by the plastics industry and the rubber industry emphasize the similarity of certain phases of their respective activities. On one hand there are plastic compositions which are distinguished by their "rubber-like" properties. Similarly, there are rubber derivatives possessing physical properties and physical forms comparable to those prepared from organic plastics.

Organic plastics are derived from four main sources: synthetic resins, cellulose derivatives, protein substances, and natural resins. Those plastics enjoying the widest commercial utilization at present are derived from synthetic resins and cellulose derivatives. The great majority of thermosetting plastics are derived from synthetic resins. Thermosetting resins are capable of being converted to infusible, insoluble materials. On the other hand, there is a large number of plastics classified as thermoplastics, which are permanently fusible and soluble in various organic solvents. A classification list of the more important plastics appears in Table I.

In this paper we will review highlights of the preparation of thermosetting materials and the forms to which they lend themselves for commercial adaptation. There are four main types of thermosetting plastics: phenol-aldehydes, glycervl-phthalates, urea-aldehydes, and melamine-aldehydes. The last two groups are similar in many respects and will be discussed together.

General Characteristics

The four main types of thermosetting materials listed above are derived from synthetic resins. They are synthesized from simple, primary, usually low-cost substances into amorphous bodies either as liquids or solids, and capable of conversion to a high molecular weight compound. The actual conversion to a rigid, high molecular weight compound takes place during the actual fabrication of the materials, *i.e.*, casting, laminating, or molding. Molded, laminated, or cast thermosetting plastics are incapable of further fabrication other than machining, and consequently where

TABLE I—CLASSIFICATIONS OF PLASTIC MATERIALS

Synthetic Resins	
Polystyrene	Polyvinyl butyral
Polymethyl methacrylate	Polyamides
Polyvinyl chloride-acetate	Olefin Polysulphides
Polyvinyl chloride	Phenol or Cresol-Aldehydes
Polyvinyl-idene-chloride	Urea-aldehydes
Polyindenes	Aniline-formaldehyde
Polyvinyl acetate	Glyceryl-phthalates
Polyvinyl formal	Melamine-Formaldehyde
Cellulose Derivatives	
Cellulose Nitrate	Ethylcellulose
Cellulose Acetate	Regenerated Cellulose
Cellulose Acetate-Butyrate	Methylcellulose
Cellulose Acetate-Propionate	Benzyl Cellulose
Natural Occurring Resins	
Shellac	Bitumen
Copal	Rubber Derivatives
Rosin	Lignin
Protein Substances	
Zein (corn Protein)	Casein
Soya-bean protein	Blood Albumen

the materials are to be molded or shaped, operations must be performed upon only partly polymerized compounds which still possess thermoplastic qualities.

In this connection, it is significant to observe that processing operations upon thermosetting plastics are designed to bring these materials up to a certain state of cure (degree of polymerization) leaving the conversion to a fully polymerized material to the fabrication operation.

While members of the plastics industry speak so knowingly of polymerization of thermosetting compounds, it is somewhat disconcerting to observe that one can only guess at the molecular weight of fully polymerized materials. The well known technique of determining molecular weight through the use of the ultra-centrifuge or Standinger's viscosity law cannot be applied to thermosetting compounds. Only guesses may be ventured through the aid of X-ray photographs of thermosetting compounds at various stages of polymerization.*

Concerning the polymerization of thermosetting compounds it is an acknowledged fact that a very appreciable molecular growth occurs. The actual mechanism of this growth will be outlined for various materials. The polymerization phenomena of thermosetting materials are marked by the establishment of cross-links between the polymer structure which extends in three dimensions. The close, inter-woven structure is of such nature as to resist softening by heat and swelling by solvents.

The tensile properties of thermosetting plastic materials are primarily dependent upon the resin structure, and unlike natural rubber and the effect of channel blacks, there are no fillers which appreciably improve tensile strength unless they expedite the resin-formation. However, fillers are widely used to control physical properties such as impact strength, flexural strength, and modulus of elasticity. Even electrical properties and chemical properties are controlled through a judicious choice of fillers.

* C. Ellis, "Chemistry of Synthetic Resins," p. 85, Reinhold Publ. Co., 1935.

Phenol-Aldehydic Resins

The general reaction of phenols with aldehydes may take place with many types of phenols and aldehydes. The reaction is one of condensation-polymerization, in which the oxygen of the aldehyde combines with hydrogen of the phenol to eliminate water, joining two molecules of phenol together at the same time. Whether or not a thermosetting structure is formed depends upon the type of phenol used. Pure phenol, meta-cresol, and 3, 5 xylenol will form highly reactive thermosetting resins.

Control over the reactivity of the resin formed may be exercised by controlling the nature of the phenol. Addition of cresylic acid, containing high proportions of ortho-cresol and para-cresol, and xylenols will form slower curing resins which are more thermoplastic in nature than the faster curing thermosetting materials. Slower curing resins are often desirable for varnishes to be used in preparing laminated plastics.

The importance of pH content in formation of phenolic resins has been recognized since Dr. Baekeland's early investigations. Likewise highly important are the ratios of primary reagents. In fact, preference is expressed for the two-stage method of manufacture whereby a Novolak, or thermoplastic resin, is prepared under conditions involving an excess of phenol. This resin is withdrawn from the reaction kettle after dehydration, and allowed to solidify. In a later stage of the processing it is compounded with hexa (hexamethylene-tetramine), an active catalyst which converts it to a potentially reactive thermosetting material through addition of further aldehydic contents. The formation of a Novolak resin is typified by the following reaction between phenol and formaldehyde:

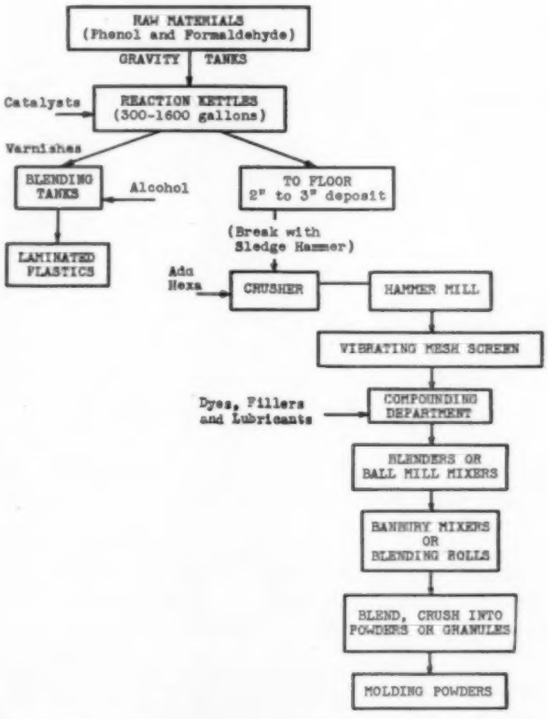
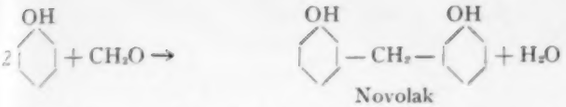


FIG. 1—Flow chart of a typical manufacture of a phenolic molding material, the procedure indicated involving dry blending of ingredients.



Novolak

Further reactions in formation of the more fully polymerized material take place at positions ortho and para with respect to the hydroxyl group, until a cross-linked structure of phenolic and methylene units is established.

A flow chart of a typical manufacture of a phenolic molding material appears in Figure 1. The procedure indicated therein involves dry blending of ingredients. To the potentially reactive resin and catalyst are added various fillers for modifying properties, various dyes or pigments, and lubricants to obtain better release in the mold. Weighing of reagents before admission to reaction kettle is shown in Figure 2.

As a preliminary to final hot blending in a Banbury mixer or hot blending rolls, the binder and filler content are best mixed mechanically while cold, as in a ball mill. This will reduce the hot blending time, which is a very critical interval inasmuch as the heat tends to set the resin up. If prolonged, the resin will kick over to the infusible, insoluble state on the rolls and will no longer be useful as a moldable material.

After the Banbury or hot blending rolls, the phenolic molding composition is broken up and screened before packing in drums for shipment to the custom molder.

Long fibrous fillers, usually obtained from cotton or shredded fabric sources, when compounded with the phenolic resins give impact resisting compositions, such as those used in the molded parts illustrated in Figure 3. In compounding fibrous fillers care must be taken to avoid breaking up of the long fibers which have a reinforcing effect.

Wood flour is employed as the filler for general purpose compounds. Considerable work has been done in the preparation of a fibrous open structure for wood flour, as through attrition grinding. Improved impact properties are observed. Among other organic fillers used with thermosetting compounds are those derived from waste vegetable by-products such as bagasse, cottonseed bulk, and coconut shells. A more complete tabulation appears in Table II. Carbon black commonly employed in rubber compounding is less used in plastics, and then serving primarily for its pigmenting value.

Among inorganic fillers of note is asbestos, used for its heat resistance characteristics. Compositions employing this filler will withstand continuous temperatures of 350 to 400°F., whereas wood flour or fabric-filled compositions are not intended for temperatures higher than 250 to 300°F. Various clays and silicates will improve surface hardness of molded parts. Mica filled phenolics are noted for their low loss factors when applied as electrical insulation.

TABLE II—CLASSIFICATION OF FILLERS

Organic Origin	Inorganic Origin
Cellulosic	*Mineral*
Wood flour	Asbestos
Cotton	Mica (powdered)
Alpha-cellulose	Diatomaceous silica
Paper pulp	Barytes
Shredded textiles	Whiting
Waste vegetable products:	Talc
Bagasse	Pumice, emery, aluminum oxide
Corn husks	Lime, zinc oxide, lead oxide
Coconut shells	Calcium sulphide, barium sulphide
Seed hulls	*Metals (Powdered)*
Walnut shells	Iron
Sisal	Lead
Carbonaceous	Copper
Graphite	Aluminum
Carbon black	
Miscellaneous	
Powdered rubber	
Plasticizers	

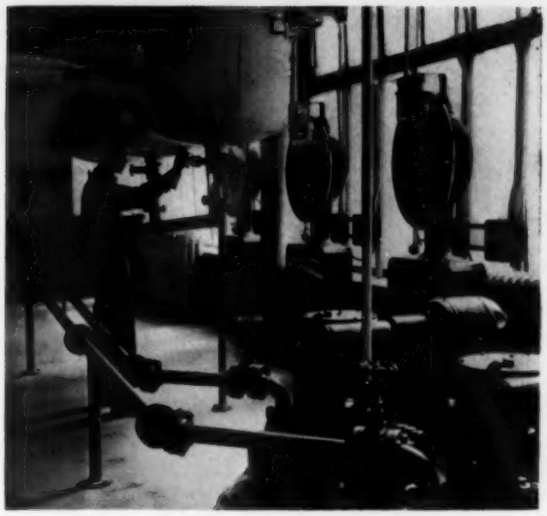


FIG. 2—Weighing of reagents before admission to the reaction kettle.

Other Phenolic Resin Compositions

Brief mention may be made of other phenolic compositions of note. Among these are the oil soluble phenolics and phenol furfural compositions. Employing certain alkyl or aryl substituted phenols as primary reagents, certain phenolic resins are prepared, which are characterized by solubility in drying oils. From these are prepared the 100% phenolic resin varnishes, an important group of the synthetic oleo-resinous varnishes and enamels. Straight phenol or cresol formaldehyde are not soluble in drying oils unless reacted with natural resins such as rosin.

Furfural is a very active aldehyde which is capable not only of polymerization within itself, but also cap-

FIG. 3 — Impact filled phenolic for oil well drilling equipment.

able of reacting with phenols to form synthetic resins. Phenol-furfural resin compositions are similar in many respects to phenol-formaldehyde thermosetting resins.

While emphasis has been placed upon molding compositions, not to be overlooked are the industrially important laminated phenolics. In processing the materials a varnish is prepared by cutting the phenol or cresol formaldehyde condensation products in the reaction kettle with an alcohol solvent. At this stage the phenolic resin is still acetone or alcohol soluble.

The resin varnish is used to impregnate paper, cloth, or asbestos, and the impregnated sheet materials are bonded into composite assemblies under heat and temperature. Sheets, rod, and tubes are prepared from laminated phenolic plastics and fabricated into various industrial products such as those shown in Figure 4.

Liquid phenolic resin may be prepared for casting in open molds in miscellaneous forms or standard shapes. This phase of plastics activitv is growing rapidly. In numerous cases rubber molds, built out of prevulcanized latex compositions, are used for giving shape to the phenolic resin. Heat or catalysts are employed to set up the resin. These materials do not employ fillers and are available in many shades of transparent and translucent colors.

Glyceryl-Phthalates

The glyceryl-phthalates, better known as alkyd resins, are best noted for their application to synthetic surface enamels. In this respect they are the best known materials, and are second only to phenolics in the total volume consumed each year for all purposes. While a direct condensation-polymerization reaction can take place between glycerol and phthalic anhydride, attention must be given to the problems of oil solubility. Cooking either of the reagents to begin with in the drying oil, natural resins, or mutual solvent, or use of higher pressures are some of the methods employed in obtaining oil solubility of the alkyd resins.

Thermosetting materials are found through the reaction of trihydric alcohols, such as glycerol, and dibasic acids, such as phthalic anhydride or maleic anhydride. The rate of resinification is, however, slower than the phenol-formaldehyde reaction. By employing dihydric alcohols such as ethylene-glycol in this condensation polymerization reaction, however, only thermoplastic materials are obtained.

FIG. 4—Parts from laminated phenolic plastics.

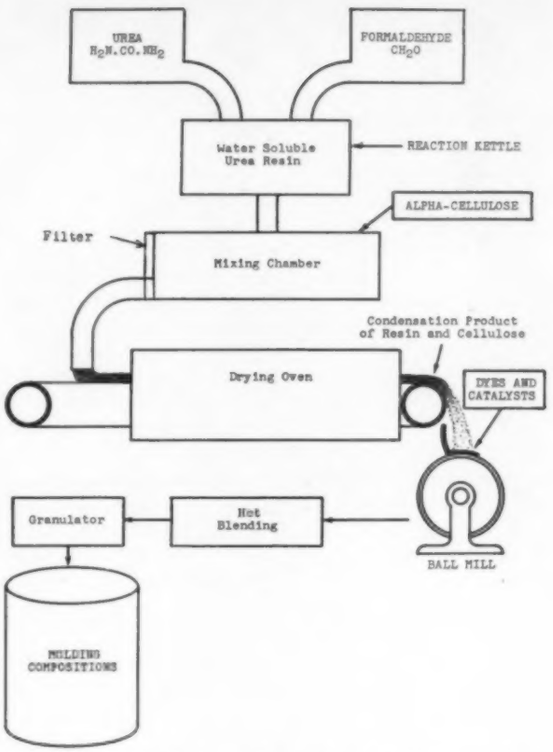


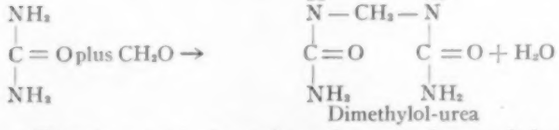
FIG. 5—Typical flow chart showing preparation of urea-formaldehyde resins.

Alkyd resins blended with various drying oils provide modern industrial finishing materials.. These resins may also be modified with other natural resins such as rosin or with some of the phenolic or urea resins. These are combined with various proportions of oils, depending upon whether parts are to be dipped, sprayed, or coatings brushed on.

Urea and Melamine Resins

Prepared under absolute clean, dust-free conditions, urea and melamine-formaldehyde resins provide many useful thermosetting compositions. The products prepared from them are noted for their translucency and attractive light fast colors. Many more color combinations are possible with these than the darker colored phenolics.

Urea is reacted with formaldehyde under slightly alkaline conditions. The resin which is first formed is water soluble. The reaction proceeds as noted below:



Dimethylol-urea

This is a typical condensation reaction and further polymerization takes place with the growth of the molecule from monomethylol urea or dimethylol urea. A typical flow chart showing preparation of urea-formaldehyde resins appears in Figure 5.

Unmodified, urea resins are rather brittle when not compounded with fillers, and will develop cracks and fissures on the surface. To avoid losing the trans-

lucent effect and to attain pastel shades, about 30% alpha cellulose is compounded with the resin by a wet blending technique. After this is dried out in an oven, it is stored until ready for further compounding in a ball mill.

Catalysts and dyes are dry blended with the urea resin and alpha cellulose. Care is taken now to avoid excess heat or contact with moisture which may activate the acidic catalysts which have been added. This same precaution carries into the molding room to avoid setting up the resin prematurely. Some of the very attractive molded urea articles appear in Figure 6.

Melamine resins have many characteristics which make them comparable to ureas. They are noted for their hard, light-fast coatings and laminated products. Melamine, a cyclic trimer, is synthesized from coke and limestone. Besides attaining considerable importance in developing hard, light-fast synthetic enamels, melamine-formaldehyde resins are being extensively employed in light colored, translucent laminates. Fifty per cent aqueous solutions of the resin are employed in impregnating alpha cellulose sheets, which are laminated together under heat and pressure.

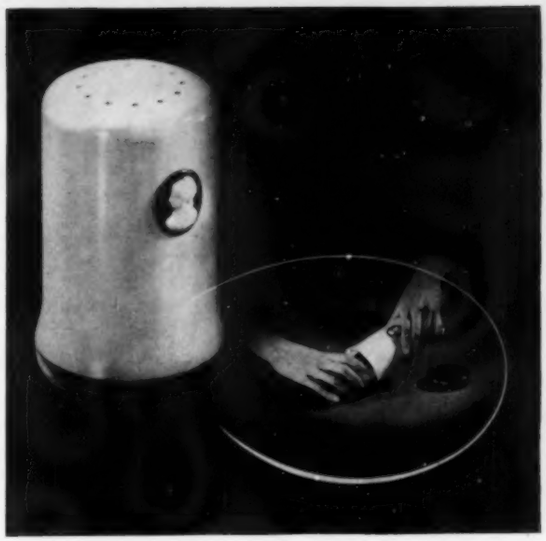


FIG. 6—Attractive molded urea articles.

Will Automobile Tires Be Made of Neoprene?

IN VIEW of the fact that approximately 75% of all rubber consumed annually in the United States goes into the manufacture of automobile tires, it was generally conceded when the first synthetic rubbers were introduced that the production of such rubber would not reach staggering proportions unless and until it was found suitable and accepted for use in tire manufacture. Therefore, a constant question placed before synthetic rubber manufacturers was, "Can your product be used in the manufacture of tires?" The Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., manufacturers of neoprene, answered this question with regard to neoprene in a frank statement of the facts in the July-August, 1941, issue of *The Neoprene Notebook*. Six facts were presented, as follows:

Fact No. 1: Neoprene was not developed as a substitute for natural rubber. It was developed by Du Pont chemists to be used in products where rubber was not entirely adequate . . . where exposure to oil, sunlight, heat, oxygen, abrasion and many chemicals prematurely destroyed the usefulness of rubber products.

Fact No. 2: Neoprene sells for more than rubber, because it costs more to produce than does crude rubber. Neoprene was not intended to compete with rubber in low-price markets.

Fact No. 3: Neoprene products have proved economical in competition with those made of natural rubber by outlasting them under severe service conditions. During the past ten years neoprene has proved its superiority in thousands of products. In every one of these products the higher original cost was more than offset by the longer life made possible by the use of neoprene.

Fact No. 4: Neoprene's excellent abrasion resistance led to experiments on the use of it in tires as early as 1932. Thousands of neoprene tires for passenger cars, trucks, tractors and airplanes have been made and tested since that time. As would be expected, some of these tires were good and some were bad, but the experience gained by this broad testing program has led us to believe that tires in which the rubber tread has been replaced by neoprene will have a service life *equal to that of the best all-rubber tires under all conditions*, and that longer service life can be expected from such tires under *certain unusually severe service conditions.*

Fact No. 5: At the present stage of development, the use of neoprene will add little to the life of tires used on passenger cars under normal service conditions. However, if the supply of crude rubber from the Far East were interrupted or cut off, neoprene and other synthetic rubbers would necessarily be used, to the extent that they are available, for passenger car tires, even though the tires would cost more and wear little better than those made of rubber.

Fact No. 6: The margin of superiority of neoprene-treaded tires is greatest where oil, heat and exposure to sunlight are important factors controlling the life of the tire. For example, neoprene-surfaced tires will outlast rubber tires on tractors and on roadbuilding equipment where the tires are not protected against direct sunlight, where the tires run over oily ground, where they are subjected to extreme cutting, under unusual heat conditions, etc.

Utilization of Waste Space Increases Insulated Wire Production

UTILIZING waste space beneath the roof of its Ambridge, Pennsylvania, plant has enabled the National Electric Products Corporation, of Pittsburgh, to appreciably step up production of its rubber insulated wire. The use of the "Synchro-tie" electric drive, a development of the Westinghouse Electric & Manufacturing Co., made possible the installation of equipment for high-speed coating and vulcanizing of rubber-covered wire. Although the entire installation is about 200 feet long, actual operating floor space is less than 1650 square feet in area.

By enlarging one of the bays of the roof structure and putting in concrete flooring, a room was created large enough to hold three vulcanizing tubers and their attendant steam pipes and motors and controls. This room is directly above the plant's store room, so that bare wire can be pulled off storage reels and carried through the insulating process.

The tubers are driven by a 25 h.p., d-c motor, with adjustable field control providing a 3-to-1 speed range. Power for the reel end is transmitted electrically from the tuber motor 175 feet away by means of the Synchro-tie device, which consists of a transmitter at the tuber end and a receiver unit at the reels. The transmitter is driven from the tuber by a variable-speed mechanical transmission unit.

The rate at which the rubber is extruded is adjusted by the speed of the d-c motor, which in turn determines the speed at which the Synchro-tie transmitter pulls the wire from the vulcanizer. The vulcanizing chambers are hung overhead in the tuber room and extend 175 feet along the roof of the plant to the room housing the take-up mechanism. In this manner, they are completely out of the way of other apparatus in the tuber room, where they might be considered as overhead steam pipes, while they present no problems strung across the roof.

Rubber is fed into three tubers and bare wire is pulled through the die-heads.

Control of the tuber motor is interlocked with that of the Synchro-tie. The d-c motor is pushbutton-controlled, and its rheostat must be in full-field position for starting or jogging. Running speed is pre-set, so that if the unit must be stopped it can be returned quickly to operating speed. D-c control must be in the de-energized position and the tuber motor must be almost at a standstill before the Synchro-tie connections can be made or broken.

Vulcanizing chambers leave the tuber room and extend 175 feet along the roof.

The take-up mechanism is driven in exact synchronism with the transmitter.

A Study of Profit Problems in the Rubber Industry

Together with a Formula for Computing Earnings Required to Absorb Taxes

By GEORGE S. MAY

Chairman, Board of Trustees,
George S. May Business Foundation

AMERICAN industry in general came through the year 1940 with a 14 per cent net gain in profits over 1939 after all income tax deductions were made. But the rubber industry failed to make the grade. Although showing a 15 per cent increase in profits before income taxes it ended with a net profit of 5 per cent less than 1939 after deductions were computed.

Many and varied reasons could be given for this lack of earning power. The effect of war on imported raw materials, our fermented labor situation, and a somewhat depressed market are probably the most commonly used excuses. These, however, are only secondary; secondary because they are beyond the power of control. All industries are more or less in the same boat, and management might just as well turn its attention to the things about which it can do something. This realistic approach, however, demands a definite understanding of earning requirements, and a downright determination to adjust the things that need adjusting if proper earnings are to be assured.

If the difference between the selling price and the cost of conversion plus the cost of materials is to become smaller, where is the money for additional taxes and profits coming from? The answer, of course, is out of the cost of operations, or out of the pockets of the investors. If the investors pay this difference it means nothing but a sacrifice on their part. If this money is to come from the cost of operations it means improved manufacturing conditions, or drastically increased plant activity.

Assuming that few new uses (outside the defense program) will be found for rubber in the near future, manufacturers will, if the problem is to be licked by increased activity, be faced eventually with a battle among themselves for volume. The armament program and the impetus that it adds to business in general will, of course, to a great degree stimulate the rubber industry. Whether or not this program can be relied upon to put the industry on a more profitable basis is problematical, but highly possible.

This possibility, however, calls for caution, because the pressure that is being brought to bear by this program on production in all lines is very apt to result in developments that will further encroach upon rubber consumption with respect to productive capacity after the emergency has passed. If a price war results the net income margin will be decreased. Only the strong will survive the competition, and strength will undoubtedly manifest itself in terms of proficiency in internal operating methods.

This proficiency, in turn, will depend on the soundness of operating policy and the clarity with which management can visualize its course of action. Strength of position, in short, will depend on the control that management has over the details of operation.

Cost and selling price are the basic factors that must be considered if the manufacturer of rubber is to profit. Many factors that cannot be controlled influence both cost and selling price, but the factors that can be controlled must be intelligently analyzed by management. Price, for example, may be established by the market, or to a major degree it may be established by competition. In any event, cost cannot be entirely disregarded in the price structure. If the

George S. May

This study of current management problems in the rubber industry together with some sound advice on how to keep taxes from encroaching on profits has been prepared especially for RUBBER AGE by George S. May, a noted management engineer and Chairman of the Board of Trustees of the George S. May Business Foundation. The Foundation is a nonprofit, fact-finding organization devoted to the interests of private enterprise and established in the belief that there is a real need for a broad, scientific study of the increasing problems which confront business management in its effort to earn profits under modern conditions.

Chart I—Excess Profit Tax Factor "F"

When

$$[(A-B)\times D]-5000 = \text{up to } \$15{,}000$$

$$100-\left(\frac{[(A-B)\times D]-5000 \text{ up to } 15{,}000}{[(A-B)\times D]-5000}\times .25\right)$$

$$+\left(\frac{\$36{,}000}{\begin{matrix}[(A-B)\times D]-5000 \text{ up to}\\ 36{,}000)-15{,}000\end{matrix}}{[(A-B)\times D]-5000}\times .30\right)$$

$$+\left(\frac{158{,}500}{\begin{matrix}[(A-B)\times D]-5000 \text{ up to}\\ 68{,}000)-36{,}000\end{matrix}}{[(A-B)\times D]-5000}\times .35\right)$$

$$+\left(\frac{\begin{matrix}[(A-B)\times D]-5000 \text{ up to}\\ 158{,}000)-68{,}000\end{matrix}}{[(A-B)\times D]-5000}\times .40\right)$$

$$+\left(\frac{296{,}000}{\begin{matrix}[(A-B)\times D]-5000 \text{ up to}\\ 296{,}000)-158{,}000\end{matrix}}{[(A-B)\times D]-5000}\times .45\right)$$

$$+\left(\frac{\text{over } 296{,}000}{[(A-B)\times D]-5000-296{,}000}{[(A-B)\times D]-5000}\times .50\right)$$

Example: Where

$$(A-B)\times D-5000 = (20-8)\times \$1{,}000{,}000)-\$5000 = \$115{,}000$$

$$F = 100-$$

$$\left(\frac{15{,}000}{115{,}000}\times .25 = 3.26\right)$$

$$\frac{36{,}000-15{,}000}{115{,}000}\times .30 = 5.49$$

$$\frac{68{,}500-36{,}000}{115{,}000}\times .35 = 9.89$$

$$\frac{115{,}000-68{,}500}{115{,}000}\times .40 = 16.17$$

$$34.81$$

$$+1.1\% \quad .38$$

$$35.19$$

$$100.00$$

$$-\ 35.19$$

$$64.81$$

price of a certain commodity as it is established by a market makes its production by certain firms inadvisable it is probably due to prohibitive cost.

On the other hand, the manufacturer capable of producing at a very low cost will not be inconvenienced by the market established price, he may even be able to upset such a price, and enjoy the pyramiding advantages accruing from low cost and increased volume. Manufacturers who set their prices purely on a market basis or a competitive basis are apt to incur severe losses. The effect of quantity on price is the eternal problem confronting the rubber manufacturer, and it is a difficult problem unless the manufacturer knows exactly the effect of quantity upon manufacturing cost.

The effect that over all volume has on manufacturing cost during a given period is comparatively easy to measure, for this volume represents plant activity, which, in turn, greatly influences the portion of cost represented by fixed charges. The effect of quantity on any one order is difficult to measure unless that quantity affects the over all volume. Credit for quantity can be given only to the influence that such quantity has upon the fixed charges associated with the particular order.

For example, a manufacturer having a fixed cost of, say, $10,000 per month, and who is operating at 50 per cent of capacity, will have a per unit fixed cost twice as high as if he were operating at a 100 per cent level. It follows that any increased quantity of individual orders bringing his plant activity closer to the 100 per cent level would have a proportional effect on his per unit fixed cost. But if the manufacturer already operated at 100 per cent of capacity, the only influence an increase in quantity on individual orders could have upon cost would be the proportionate reduction in the per unit cost associated with better methods, set up cost, order entering, etc.

In short, the effect of unit order quantity on over all volume can be considered a pricing factor until the point has been reached where activity is 100 per cent of capacity. Up to this point both the effect of over all volume and the effect of individual order volume must be considered. Beyond that point the effect on individual order costs alone need be considered.

Too frequently the responsibility for advantages in unit order quantities is placed solely upon the production department. In other words, it may take a salesman only a little longer to close a deal for a mil-

CHART II—NORMAL TAX FACTOR "H"

(Includes Defense Tax)

$$\text{When } E = \left(\frac{[(A-B)\times D]-\$5000}{F}\right) +$$

$(B \times D)$ .5000 = up to

$$100 - \left(\left[\frac{E \text{ up to } \$4{,}257.50}{E}\right] \times .1485\right) \quad \$4{,}257.50$$

$$\left(\left[\frac{E \text{ up to } \$20{,}847 - 16{,}782.50}{E}\right] \times .187\right) + \quad \$20{,}847$$

$$\left(\left[\frac{E \text{ up to } \$29{,}310.07 - \$25{,}144.07}{E}\right] \times .369\right) + \quad \$29{,}310.07$$

$$\left(\left[\frac{E \text{ up to } \$16{,}782.50 - 4{,}257.50}{E}\right] \times .165\right) \quad \$16{,}782.50$$

$$\left(\left[\frac{E \text{ up to } \$25{,}144.47 - \$16{,}782}{E}\right] \times .383\right) \quad \$25{,}144.47$$

over $29,310.07

24%

Example

$$E = \left[\frac{[(A-B)\times D]-\$5000}{F}\right] + (B \times D) + \$5000 =$$

$$\left[\frac{[(20\% - 8\%) \times 1{,}000{,}000] - 5000}{64.81}\right] 80{,}000 + 5000 = \$262{,}441$$

E being over 38,565.89 equals 24%

100 — 24 = 76

FORMULA

A = Per Cent of capital desired as net profit after tax deductions.
B = Per Cent of capital exempt from excess profit tax.
C = Per Cent of invested capital subject to excess profit tax.
D = Amount of invested capital.
E = Required earnings after normal tax deductions, but before excess tax deductions.
F = Excess Tax Factor
H = Normal Tax Factor

lion units than it would to sell a thousand units, but he often expects the same per unit commission on the million as on the thousand, and expects the manufacturer to make up any price advantage he has given the customer. A point of equity should be borne equitably by all factors.

A significant finding of the survey concerns income taxes. Manufacturers too often pay little attention to income taxes until it is time to make out income tax returns, and then wonder why they fall short of anticipated net earnings. Taxes, the most certain factor in business today, must be considered in pricing, and must be taken into account while lining up business for profitable operation. Taxes are such a prominent factor of cost that the traditional method of computing costs on the basis of last year's overhead without respect for future taxes can no longer be used. Moreover, tax laws and regulations are changing rapidly, and each change affects costs.

Increased earnings to compensate for higher wages, higher taxes and higher material costs can come from only two sources. They will come from the slack there may be in the cost line, such as wasted material, wasted energy, and wasted supplies that may be eliminated, or they will come out of fixed cost through the channel of expanded activity. In industries where consumer markets can be expanded proportionately the problem solves itself. But the rubber industry cannot look forward to any great increase in consumer demand except perhaps the temporary demands of defense production.

Knowing what his 1941 tax burden will be, how can a manufacturer determine the volume necessary to net the desired income on invested capital over and above these taxes?

Let us assume that a company having $1,000,000 invested desires to earn 20 per cent on its invested capital, or $200,000 after all tax deductions have been made. Let us also assume that, as in 1940, 8 per cent of the invested capital plus $5,000 is to be exempt from excess profit tax. The taxable excess would then be 20 per cent minus 8 per cent minus $5,000. Eight per cent of the capital in this case would be $80,000, and deducting this amount and the $5,000 exemption from the desired $200,000 we would have $115,000.

Referring to Formula F (Chart 1) we find that

the excess tax factor for this amount ($115,000) is 64.81. Dividing the taxable excess by this factor we have $177,441. This plus the exempted amount equals $262,441, which must be earned before excess profits tax deductions, but after normal income tax deductions. This figure divided by the normal tax factor which we find by Formula H (Chart 2) to be .76 for $262,441 shows that the company would have to earn $345,317.10, or 34.53 per cent on its capital to net 20 per cent.

The next step is to ascertain the dollar sales volume required to accomplish this earning. Let us assume that this same manufacturer has a cost structure as follows:

Material costs	40%	
Labor costs	12%	
Variable Mfg. Expense	8%	
Annual Fixed Mfg. Exp.		$165,000
Variable Selling Exp.	12%	
Fixed Selling Exp.		25,000
Variable Administrative	5%	
Fixed Administrative		100,000
Required Earning		345,317
Total	77%	$635,317

From this structure we find that the manufacturer's variable costs constitute 77 per cent of his sales dollar. Therefore, his fixed charges plus earnings for taxes and profits, $635,317, must constitute 23 per cent. To find the sales amount that $635,317 is 23 per cent of we divide $635,317 by .23, which gives us $2,762,248 a year to retire our costs, pay our taxes, and earn 20 per cent on our investment.

Setting up a proper cost structure and ascertaining necessary earning requirements, sales volume, etc., is not, of course, the whole answer to the problem of profitable operation. After these facts have been established it is still necessary for management to inaugurate the necessary procedures to insure proper pricing and sales volume, in relation to the cost provided for in the cost structure if it is to come out with a profit. This not only requires a well established organization, clearly defined responsibilities and proper man power, but also a rigid control by management over all operations.

In conclusion it might be briefly stated that the management of the rubber industry must ascertain the one most profitable method of operation, and then strictly enforce that method.

Monsanto Plasticizers for Synthetic Rubber

THE Rubber Service Department of Monsanto Chemical Co., Akron, Ohio, has a complete line of plasticizers for use with all types of synthetic rubbers. The line includes tricresyl phosphate, triphenyl phosphate, dibutyl phthalate and Santicizer B-16 (butyl phthalyl butyl glycollate), all of which are suggested by various synthetic manufacturers, as well as a number of special plasticizers, including Santicizer E-15 (ethyl phthalate ethyl glycollate), Santicizer M-17 (methyl phthalate ethyl glycollate), diethyl, dimethyl, diphenyl phthalates and others.

Tricresyl phosphate is a practically colorless, odorless liquid, weighing about 9.7 pounds per gallon. It has a high boiling point and an evaporation loss of only 0.2% in 100 hours at 100° C. Its viscosity increases rapidly at temperatures below normal until at —35° C. it is a solid, transparent mass without crystalline structure. It is miscible with all the common solvents and thinners, and with linseed, china wood and castor oils. It imparts excellent flexibility and increased amounts do not cause proportionately as great a decrease in tensile strength as most other plasticizers.

Triphenyl phosphate is a white crystalline compound melting at about 48.5° C. and boiling at 245° C. at 11 mm. pressure. Its evaporation rate is of the same order as tricresyl phosphate. This product is miscible with the common solvents and thinners and with vegetable oils. Its solubility in water is 0.001% at 34° C. and 0.002% at 54° C. One of its most valuable properties is that of fire retarding.

Dibutyl phthalate, which is one of the most widely used plasticizers for nitrocellulose, is a practically colorless liquid which boils at 340° C. at atmospheric pressure and 206° C. at 20 mm. and crystallizes at about —35° C. It has a weight of about 8.75 pounds per gallon. Dibutyl phthalate is miscible with all the common organic solvents and with oils but is soluble in water only to the extent of 0.001% at 30° C. The stability of this material and its high solvent power for most plastic materials make it one of the most acceptable plasticizers for general use.

The Santicizers, which are phthalyl glycollate plasticizers, as indicated above, are colorless liquids, with melting points ranging from 189° to 219° C./5 mm., each type containing specific properties of its own.

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See page 357

Possibilities of Guayule Rubber

A Question-and-Answer Forum Concerning the Widespread Development of Guayule in America

By JACKSON BARBER

In view of the fact that there is now pending a bill in the House of Representatives providing for the planting of 45,000 acres of guayule rubber in order to make available a domestic source of crude rubber for emergency and defense uses (H.R. 5030), the following article, consisting of questions on guayule raised by Congressman Anderson (of California) and answered by Dr. David Spence, noted guayule expert, is both timely and of unusual interest.—Editor.

RUBBER manufactured from the American-grown guayule shrub to supplant tree rubber from the Orient in the event of Japanese-American hostilities was the object of a thirty-minute address by John Z. Anderson in the House of Representatives on April 16, 1941. Described by him were the methods of planting, harvesting, and extraction employed by Intercontinental Rubber Company, at Salinas, California, only producers of guayule rubber in America. Overlooked by Congressman Anderson in his address was a tested quick-crop, emergency plan for growing guayule outlined in a national magazine in 1930 by Dr. David Spence, rubber chemist and technologist.

Dr. Spence, who served as chairman of the Rubber Division of the War Industries' National Research Council during the last war, was vice-president of the guayule rubber company from 1925 to 1931, splitting

General view of the nursery maintained at Salinas, Calif., by the Intercontinental Rubber Co.

Appearance of the guayule shrubs during their fourth year, ready for harvesting.

with the company over production methods. Although primarily a specialist in synthetic rubbers, Dr. Spence recently discovered a method of vulcanizing rubber by sunlight or its artificial equivalent, while working in the Jacques Loeb Laboratory of the Hopkins Marine Station of Stanford University at Pacific Grove, California. Paradoxically, coming in the wake of this invention, Dr. Spence was chosen to deliver the first Charles Goodyear Lecture at the meeting of the Division of Rubber Chemistry, September 11-12, 1941, at Atlantic City, N. J. (EDITOR'S NOTE: Due to illness Dr. Spence will be unable to appear and the lecture has been postponed).

Congressman Anderson, learning that this one man had wider knowledge of guayule and its production than any other in the world, wrote to Dr. Spence about the shrub, shaping his letter as a series of questions. These questions, with Dr. Spence's answers, arranged together in the following order, reveal the great opportunity for rubber independence that now lies untouched in the lap of a worried America:

ANDERSON: Do you think it possible to raise guayule rubber on a commercial basis by sowing the seed thick and harvesting in less than a year?

SPENCE: It has been definitely established and reported that Guayule plants, grown in California, less than a year old, contain more than 6% of pure rubber or on the basis of the number of plants per acre (by count) more than 1000 pounds of pure rubber per

acre. While much may have to be done to translate these findings to agricultural practice, nevertheless, I consider this an all important approach to the problem of Guayule cultivation in this country both for the present emergency and for the future. In the hands of practical farmers, aided by technical assistance and with "treated" seed available, I see no reason to doubt for one moment the successful application in some form of this all important development as a practical matter.

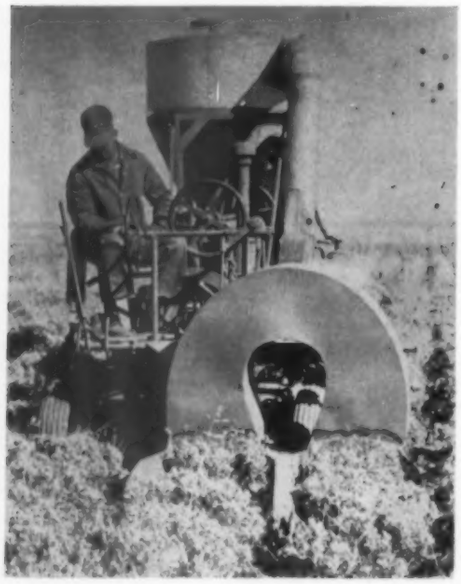
ANDERSON: Do you think that this manner of growing, harvesting and milling the rubber would be at a greater cost or less than under the method of raising the seedlings in the nursery, transplanting them to the fields and harvesting at the end of 4 to 7 years?

SPENCE: Any such method of growing and harvesting Guayule will greatly reduce the difficulties and costs of cultivation, harvesting, chopping, and treating to extract the rubber as at present carried out on a four year cycle notwithstanding statements to the contrary reported to you in your address to Congress of April 16, 1941.

ANDERSON: Have you any way to estimate the cost per pound of producing the rubber in this manner, that is, the plan of producing it in less than a year, and if so, approximately what do you estimate?

SPENCE: Until large scale plantings have been made in this way, in the field, actual savings cannot be determined.

ANDERSON: As I understand it, you have always advocated this plan, of planting the seed thick and harvesting and milling the rubber the same year, but wouldn't it be advisable to raise some rubber under the other plan, that is, transplanting the seedlings and allowing the plants to remain in the ground for any number of years until there is an emergency or until the price of rubber is such that it would warrant harvesting a big acreage?



Two-row seed picker, of 1941 construction, now in use at the Salinas plantation.

SPENCE: I see no objection to planting sufficient acreage to Guayule rubber under present practice if only to serve as a reserve supply of rubber in case of emergency. In this connection I feel, however, that the space per plant could be advantageously reduced in order to force the development of rubber each year and to increase the yield per acre. It has been definitely established that Guayule does not produce maximum rubber except under conditions of drought and enforced curtailment of its physical development.

ANDERSON: What in your opinion would be the value of planting Guayule rubber as a protection against soil erosion, and do you think it would be possible to plant the shrub on hillsides even though it would be necessary to do so by hand?

SPENCE: The value of Guayule as a protection against soil erosion on hillsides will have to be determined.

ANDERSON: What would you say the results were as to additional fertility to the land by growing Guayule rubber?

SPENCE: I do not believe that Guayule adds anything to the soil on which it is grown. On the other hand it will not produce rubber in maximum quantity on rich soil or under conditions where growth is unrestricted.

ANDERSON: I understand you were with the Diamond Rubber Company, where they deresinated some 30,000 pounds of guayule rubber per day. Can you give me any figures as to the approximate cost per pound for deresinating and purifying the rubber? Have you any estimates as to what you think improved, modern machinery might cut down this cost?

SPENCE: By comparison with the means in use in 1908 for solvent extraction and purification of Guayule rubber I would say that the costs involved by modern methods for the purification of the rubber and recovery of the solvents employed should not exceed one quarter of one cent per pound of rubber extracted. The value of the resins recovered will largely offset the cost of extraction. On the other hand, you should not overlook the fact that rubber of improved quality such as was used in tires and tubes made entirely from California-grown Guayule was produced by a process of "retting" of the shrub without solvent extraction; also it has been shown that the rubber in the Guayule shrub can be recovered as a Latex, similar in properties to the latex extracted from Hevea in the Far East. By this means the acetone extract, also the bagasse and insoluble impurities present in Guayule as currently produced, are reduced to meet the requirements of the rubber manufacturing industry in a much larger way than is now possible. I merely mention these matters to indicate some of the latent possibilities in connection with the development and betterment of Guayule rubber looking to the future. One thing is certain. If Guayule is ever to attain wide application and extensive use by the rubber manufacturing industry, it will have to be a product refined and improved over anything currently available.

ANDERSON: I notice your very complimentary remarks in regard to Dr. McCallum's work in developing new varieties of the guayule shrub, but as I understand it, since those remarks were made, Dr. McCallum has almost doubled the percentage of rubber

in the plant. Therefore, what in your opinion would be the minimum price for which rubber could be produced per pound in large quantities after thorough experimentations had been carried out?

SPENCE: I believe that rubber can now be produced from Guayule in this country at ten cents a pound and for less when its potential possibilities have been fully developed to practical account.

ANDERSON: Is it your opinion, that guayule rubber properly handled, could compete successfully at any time with Hevea rubber from the Near East?

SPENCE: It is my opinion that Guayule, properly handled and developed, can compete successfully with Hevea from the Far East. I doubt very much if any plant erected in this country to produce synthetic rubber can hope to compete with Guayule in the matter of cost.

ANDERSON: Is there any fundamental difference between Hevea rubber and guayule rubber after being refined?

SPENCE: The physical properties of "refined" Guayule are very much in its favor today when time of mixing has called for the development of more plastic rubbers.

ANDERSON: There have been a number of suggestions, such as a guaranteed price to the producer; furnishing seed by the Government to growers; a provision in the Army Supply Bill that Government purchases of rubber must be from products grown in this country; an appropriation of money sufficient to make a thorough investigation and complete experiments by the Government with the belief that this knowledge will make it so attractive that private capital will immediately encourage the growing of guayule rubber. Have you any suggestions along this line?

Rear view of the guayule planting machine, showing the electric spacer.

SPENCE: In answer to this question it seems to me that the possibilities of Guayule, such as I have pointed out, should at once be thoroughly investigated by competent authorities and tests undertaken to determine its value in the best practical way, both to the farmer and to the rubber manufacturing industry alike. Until this has been done and until the results have been made known it is both foolish to speculate on the ultimate future and final value of Guayule or, on the other hand, to dismiss it as of no account.

Advagum—An Auxiliary Material for Synthetic Rubbers

ADVAGUM, an entirely new synthetic auxiliary material for use with synthetic rubbers, was recently introduced by the Advance Solvents & Chemical Corp., 245 Fifth Ave., New York City. It is a non-tacky, rubber-like solid material, in slab form, has a mild, pleasant, turpene-like odor, and is dark amber in color. Its specific gravity is 1.1 at 25° C. It is insoluble in petroleum distillates and most vegetable oils.

The acid resistance of Advagum is said to be exceedingly good, especially against hydrochloric and sulphuric acids. It does not char, darken or decompose in contact with such acids. Its compatability with such synthetic rubbers as neoprene, Hycar, Perbunan and Thiokol, as well as with cellulose nitrate and polysterene, is described as excellent, but it has very poor compatibility with natural rubber.

Advagum is primarily recommended by its supplier for use in the compounding of synthetic rubbers to improve their processing qualities, to increase the tear resistance of the vulcanized products, to decrease the swelling of the compounds by petroleum oils, and to improve the aging characteristics of compounds containing it. Although Advagum itself does not vulcanize, it does remove from useful activity such an amount of vulcanizing ingredients that its presence cannot be ignored in the batch.

No special milling, mixing or vulcanizing procedures are necessary with the auxiliary material. The suppliers simply recommend that the synthetic rubber be given the necessary normal break-down on the mill, then the Advagum should be milled in next before proceeding with working in the other ingredients.

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See page 357

Rubber Division, A. C. S., Meets in Atlantic City, on September 11 and 12

A RECORD attendance is anticipated at the meeting of the Rubber Division, A.C.S., which will be held in Atlantic City, N. J., on Thursday and Friday, September 11th and 12th. The meeting will feature a Symposium on "Rubber for Defense," eight technical papers, a report by the Crude Rubber Committee, and the banquet. Headquarters for the Division are at the Ritz-Carlton Hotel, the symposium and technical sessions will be held at the famous Atlantic City Convention Hall, while the banquet will be held at the Ambassador Hotel.

The symposium will include four papers, the titles and authors of which are given below. It will be held on Thursday afternoon, September 11th, beginning at 2:00 P.M. The present status of crude, synthetic and reclaimed rubber, as well as rubber chemicals and compounding ingredients, will be discussed by competent speakers.

In addition, W. L. Finger, formerly of the Rubber Manufacturers Association, and now chief consultant of the Rubber Unit of the Office of Production Management, will discuss cooperative measures between rubber manufacturers and the government. Unfortunately, due to illness, Dr. David Spence, noted rubber technologist, selected as the first Charles Goodyear Lecturer, will not be able to be present and the lecture has been indefinitely postponed.

Novel Program for Banquet

The Entertainment Committee, in charge of banquet arrangements, which is headed by Peter P. Pinto, General Manager of RUBBER AGE, promises one of the most novel programs yet presented at a Division dinner. A full variety show has been scheduled combining talent and humor. Because the Committee must advise the management of the Ambassador Hotel as to the total number expected at the banquet, it will not be possible for any tickets to be sold after 12:00 Noon on Thursday.

Therefore, it is urgently requested that all those planning to attend the banquet purchase tickets or have tickets purchased for them either on Wednesday, September 10th, or Thursday morning, September 11th. Tickets will go on sale near the A.C.S. registration desk at Convention Hall and in the lobby of the Ritz-Carlton Hotel on Wednesday morning. To avoid disappointment, get your tickets early.

Abstracts of the technical papers, together with the names of the authors and their company connections, as well as the titles and authors of papers in the symposium, follow:

Program of the
DIVISION OF RUBBER CHEMISTRY
AMERICAN CHEMICAL SOCIETY
Convention Hall—Atlantic City, N. J.
September 11-12, 1941

Thursday Morning—September 11

10:00 A.M.—Executive Committee Meeting

Thursday Afternoon—September 11

2:00 P.M.—Symposium on "Rubber for Defense." Introduction by Dr. R. H. Gerke (U. S. Rubber), Chairman

Thursday Evening—September 11

6:30 P.M.—Division Banquet, Ambassador Hotel.

Friday Morning—September 12

9:00 A.M.—Report of the Crude Rubber Committee, by G. A. Sackett (Goodyear), Chairman.

9:30—11:55 A.M.—Technical Session.

Friday Afternoon—September 12

1:30—3:30 P.M.—Technical Session.

3:35 P.M.—Business Meeting.

ABSTRACTS OF PAPERS

Thursday Afternoon—September 11

Symposium: Rubber for Defense

2:00 P.M.—Introduction. ***R. H. Gerke, Chairman, Division of Rubber Chemistry.***

2:10 P.M.—Cooperation of the Rubber Industry with Defense. ***W. L. Finger (Chief Consultant, Rubber Unit of the Office of Production Management, Washington, D. C.)***

2:55 P.M.—The Present Status of Crude Rubber. ***E. G. Holt (Department of Commerce, Washington, D. C.).***

3:30 P.M.—The Present Status of Synthetic Rubber. ***E. R. Bridgwater (E. I. du Pont de Nemours and Company, Wilmington, Delaware).***

4:00 P.M.—The Present Status of Rubber Chemicals and Reclaimed Rubber. ***J. P. Coe (Naugatuck Chemical Division of U. S. Rubber Co., New York City).***

Friday Morning—September 12

9:00 A.M.—Report of Crude Rubber Committee. ***G. A. Sackett, Chairman (Goodyear Tire and Rubber Company, Akron, Ohio).***

9:30 A.M.—A Statistical Study of the Determination of the Variability of No. 2 Smoked Sheet. *Hugh M. Smallwood (United States Rubber Company, General Laboratories, Passaic, N. J.).*

A replicated experiment on the variability of four shipments of No. 2 smoked sheet has yielded the following conclusions:

Variations within shipments were much smaller than variations between shipments.

In this experiment mixing errors were negligible, but errors of curing were appreciable.

Addition of extra stearic acid to the A.C.S. recipe did not materially increase uniformity of results, raised modulus and tensile, did not change T-50.

Standard deviations have been tabulated for variation within shipments, for curing error and for testing error, with respect to shearing viscosity, modulus, tensile, and breaking elongation.

A detailed program is proposed for determination of the standard deviation of the supply of crude rubber.

10:00 A.M.—Unstable Addition Compounds of Sulfur with Zinc Dithiocarbamates. *Ross E. Morris (Rubber Laboratory, Navy Yard, Mare Island, Calif.).*

It is demonstrated by means of solubility determinations in benzene and cyclohexane at 30° C. that sulfur forms unstable addition compounds with zinc salts of diethyl dithiocarbamic acid and dibutyl dithiocarbamic acid. These addition compounds are believed to play an active intermediate role when rubber containing a zinc dithiocarbamate accelerator is vulcanized at room temperature. The addition compounds exist solely in solution, since evaporation of a solution containing sulfur and a zinc dithiocarbamate leaves crystals of the pure substances.

The solubility of zinc diethyl dithiocarbamate in benzene is increased when sulfur is present, and the amount of increase is directly proportional to the amount of sulfur added. Similarly, the solubility of sulfur in benzene is increased when zinc diethyl dithiocarbamate is added to the solution, and the amount of increase is directly proportional to the amount of dithiocarbamate added. The relations in both cases being of the first order, it is evident that one molecule of sulfur reacts with one molecule of zinc dithiocarbamate to form one molecule of the addition compound.

Cryoscopic determinations of molecular weights in benzene show that sulfur exists in the form of S_8 molecules and the zinc dithiocarbamates are in the form of un-associated molecules. It is concluded, therefore, that the reaction takes place according to the equation

$$S_8 + Zn(SCSNR_2)_2 = Zn(SCSNR_2)_2 \cdot S_8$$

where R is a hydrocarbon radical.

10:30 A.M.—The Effect of Reinforcing Pigments on the Unsaturation of Rubber Hydrocarbon. *F. S. Thornhill and W. R. Smith (Godfrey L. Cabot, Inc., Boston, Mass.).*

Previous investigators have demonstrated that the extent of unsaturation of rubber hydrocarbon in various stocks decreases with time of cure and per cent of combined sulfur. The present investigation has been undertaken to ascertain what effect fillers of varying reinforcing ability have on this decrease of unsaturation with time of cure and amount of combined sulfur.

The unsaturation of the rubber hydrocarbon was determined by the iodine chloride method as modified by Blake.

The first compounds studied consisted simply of sulfur, rubber, and carbon black. The anticipated decrease in unsaturation with time of cure and combined sulfur was noted. The effect was about the same as noted for a sulfur-rubber mix.

The above experiments were repeated in a typical accelerated tread stock recipe. In this case no decrease in unsaturation with increasing amounts of combined sulfur could be detected over the range of cures investigated.

When the reinforcing pigment was omitted from this accelerated compound, the unsaturation decreased regularly with time of cure and amount of combined sulfur.

The present data suggest that reinforcing fillers not only affect the rate of combination of sulfur during vulcanization, but may also alter the nature of the reaction by which this combination occurs.

While unsaturation may be a prerequisite for reinforcement, as it is for vulcanization, there is no indication from the present data that the association between double bond and reinforcing agent is in the nature of a true chemical bond.

The degree of unsaturation of a number of synthetic rubbers and the hydrocarbon content of several samples of reclaim rubber have also been determined by the iodine chloride method.

11.00 A.M.—Brittle Point of Rubber Upon Freezing. *M. L. Selker, G. G. Winspear, and A. R. Kemp (Bell Telephone Laboratories, New York City).*

This paper supplies the need for a simple, rapid, and accurate method for determining the brittle temperature of rubber and allied materials.

The method depends on the fact that when either natural or synthetic rubber is cooled a temperature is reached where the material will fracture under bending stress. This temperature is sharply defined and varies with composition and structure of the material.

The brittle temperature of soft vulcanized rubber is found to be substantially independent of the state of cure within the limits found in industrial practice. However, in rubber-sulfur compounds where a large amount of sulfur is used there is very nearly a linear dependence of brittle temperature on combined sulfur. Additions of reinforcing pigments produce little effect, whereas coarse fillers raise the brittle temperature.

With the exception of Buna 85 and Buna S all synthetic rubbers have higher brittle temperatures than rubber. In contrast to natural rubber compounds the carbon black reinforced stocks of the synthetics show a lower brittle temperature than the crude material.

Brittle temperature has been found to be independent of molecular weight within wide limits above a minimum value.

Friday Afternoon—September 12

1:30 P.M.—The Effect of Low Temperature on Neoprene Vulcanizates. *F. L. Yerzley and D. F. Fraser (Organic Chemicals Department, Rubber Chemicals Division, E. I. du Pont de Nemours & Company, Inc., Wilmington, Del.).*

Immunity to the effects of extreme cold is becoming of increasing importance in many engineering applications of rubber-like materials. This requirement is particularly important in the operation of automotive and aeronautical equipment. However, the physical changes that take place in rubber-like materials at low temperatures are not clearly understood and extensive studies of testing methods and compounding must be continued in order to enlarge the knowledge of these phenomena.

Three test procedures, each with its peculiar advantages and disadvantages, have been employed in the DuPont Laboratories. One method utilizes a modified T-50 technique. A second method employs a special holder in the T-50 apparatus in which a 1 x 3 inch strip is twisted, the torque being autographically recorded as a function of the angle of twist. Loading and unloading curves provide a hysteresis loop. The third method employs a Shore Durometer mounted in a cold box in such a way that it can be brought in contact with a series of ½ x ¾ inch diameter specimens without opening the box for operation.

All three tests have been useful in the development of compounds, but final evaluation is now made primarily with the Durometer test.

It has been found that compositions respond differently to the effects of time and temperature and that routine tests following an arbitrary procedure may be inconclusive or misleading. However, as a practical compromise hardness data are taken after 2, 4, 6, and 24 hours' exposure at the test temperature.

By the use of these tests progress has been made in com-

pounding for greater resistance to the effects of low temperature. A comparison is made between rubber and Neoprene Types GN and FR vulcanizates. The effect of sulfur, softeners, and state of cure on the freeze resistance is discussed.

2:00 P.M.—The Electrical Properties of Neoprene. *F. L. Yerzley (Organic Chemicals Department, Rubber Chemicals Division, E. I. du Pont de Nemours & Company, Inc., Wilmington, Del.).*

During the past decade, the mechanical properties of neoprene have been employed over a range of applications and, as a consequence, these properties of neoprene and its limitations have become well known. The electrical properties of neoprene have been applied less extensively and as a result are not as well known. In this paper, the development of the electrical properties of neoprene is described, up to the present date. The last decade, for example, has seen the d-c resistivity increased from 5×10^{11} ohm cm. to 5×10^{13} ohm cm. Data on power factor and dielectric constant at 1000 cps also are given.

Neoprene, like rubber, can be rendered electrically conducting and by the same means and to the same extent. The effects of carbon black on conductivity and on other electrical properties are given.

Electrical properties, sometimes but vaguely understood in numerical values, are compared for a range of familiar materials, so that the relative position of neoprene with respect to other materials used in electrical industries can be better understood.

2:30 P.M.—Static Electric Problems in Tires. *E. E. Hanson and J. W. Liska (Firestone Tire & Rubber Co., Akron, Ohio).*

The onset of static electric difficulties, particularly in passenger automobiles and busses, is described and probable reasons for their inception in recent years are discussed. The discussion includes references to both phases of the problem, *i.e.*, radio interference in passenger automobiles and static shock in busses.

A mathematical expression relating voltage generated with the conductivity of the tires has been obtained. It is shown that the equation is entirely consistent with observed experimental data.

A laboratory testing machine for evaluating the static generating properties of rubber compounds is described, together with data on the effect of some compounding ingredients. Methods and techniques involved in measuring resistivity of rubber compounds are also described in detail. It is demonstrated that a correlation exists between static generation and resistivity of a stock.

The importance of semi-conducting tires in aviation and in industrial trucking, especially in munitions plants, is developed. The relation between "dispersion" and resistivity is briefly discussed.

3:00 P.M.—Static Electricity and Its Effect on Car Radio Performance. *S. M. Cadwell, N. E. Handel and G. L. Benson (U. S. Rubber Company, Detroit, Mich.).*

Static electricity has long been a problem in the automotive industry. The problem from the tire manufacturers' viewpoint is divided into two phases: shock static and tire radio static. The number of tire static complaints registered by the public has recently increased to serious proportions. These complaints have necessitated an intensive study of the static problem.

Electrostatic charges are generated whenever two dissimilar substances that have been in contact are separated, as in the case of a tire running on a road surface. Recent extensive development work on the problem of tire static has yielded a large number of unexpected and interesting results. Studies have been made of charge and voltage distribution on tires running on test wheels. In addition, a large number of road tests have been made at many places in the United States to determine the effects of tire electrical resistance, road resistance, relative humidity, and antenna design upon tire static production. From these data a theory has been evolved, which explains the method of tire static generation and correlates seemingly inconsistent observations. It is shown that charges upon the tread surface of the tire can charge the car either by conduction or by induction, and also that tire radio static is not due to electromagnetic radiation but due to changing electrostatic fields.

As a consequence of this theory, methods have been developed for minimizing both static shock and radio static due to tires.

Microphone Made of Frozen Rubber

A MICROPHONE made from frozen rubber is revealed in a recent U. S. patent (No. 2,231,159) granted to Erwin Gerlash of Berlin, Germany, and assigned to the Telefunken Gesellschaft fur Drahtlose Telegraphie, Berlin. Frozen rubber, the inventor has discovered, can be vibrated by sound waves, and when so vibrated generates corresponding modulated electrical impulses. Amplified, these impulses can be sent over wire or through the ether to reproduce the sound in telephone receivers or on radio loudspeakers.

The frozen rubber is utilized in the form of a thin plate or disk as the diaphragm of the microphone. The currents generated in it by sounds are picked up by two metallic plates which transfer the impulses to the transmitting system.

To produce the rubber element a solution of rubber is frozen while it is subjected to an electric field. The electric field lines up the rubber molecules in one direction, in which position they are fixed when the rubber is frozen solid. This arrangement of the molecules is thought to account for the ability of the rubber to generate electric currents when it is vibrated. Once frozen the rubber does not melt. It is similar to vulcanized rubber.

Plasticizer C-24

A NEW MATERIAL, Plasticizer C-24, intended for use as a softener for natural and synthetic rubber or as a solvent type plasticizer for coatings, plastics, cellulose derivatives, and other materials, has been announced by the Resinous Products & Chemical Co., Philadelphia, Penna. Plasticizer C-24 is a cyclic ketone, a derivative of isophorone of high molecular weight, which is characterized by high plasticizing efficiency, chemical inertness, high boiling point, low freezing point, and low vapor pressure. It is a very high-boiling liquid, pale yellow in color, with a mild but distinct odor.

The new softener is compatible with many of the synthetic rubbers and plastics which require plasticizers or softeners in their compounding, such as neoprene, polyisobutylene (Vistanex), chlorinated rubber (Parlon), nitrocellulose, ethyl cellulose, and also natural rubber. Its compatibility with the Buna type of synthetic rubber, however, is limited, and it is incompatible with cellulose acetate. It is also incompatible with polyvinyl chloride in a two component system, but its chemical structure is said to suggest its possible use with vinyl compounds together with other modifiers.

Editorials . . . . . .

Allotments of Rubber

WHEN General Preference Order M-15, designed to conserve rubber in the United States by setting up a curtailment program, made its appearance on June 20, its terms sounded harsh to the rubber manufacturing industry. The order prohibited any processor of rubber from using in any calendar month from July to December, 1941, inclusive, more than a specific percentage of his average monthly consumption during the twelve-month period ending on March 31, 1941. Both small and medium-sized rubber manufacturers immediately set up a howl that such restrictions would result in sharp curtailment of their production, subsequently followed by large lay-offs of labor.

Commenting on the preference order shortly after its issuance, we stated that these were no days for manufacturers to lose their heads, and suggested that no hasty moves be made either in the direction of curtailing production or dismissing employees, predicting at the same time that a careful analysis of the situation by official Washington would probably result in certain changes favorable to the industry, since it is definitely not the intention of the Government to dislocate industry. Events of the past few weeks bear out the logic behind that statement and also our prediction.

It was immediately evident that the "quota" system set up in the preference order would work almost instant havoc with small manufacturers. In the first place, such manufacturers were not particularly over active in the twelve months preceding March 31, 1941, the base period, and therefore their monthly averages would be much smaller proportionately than the averages of those concerns which had the added advantage of defense orders and accordingly had stepped up production in many cases to near capacity or, in some cases, to capacity. Some of the other companies, particularly the smaller tire manufacturers, were in almost the exact same spot. The Office of Production Management recognized this problem as soon as the "quota" system got under way.

Accordingly, the O.P.M. acted to relieve the situation. Although it was too late to make a definite change in the preference order where allotments of crude rubber for processing during the month of August was concerned, special arrangements for that month were made. One group of manufacturers was told there would be no change in their status; another group, consisting of companies which for the most part were working on defense orders, was allowed larger allotments; while a large number of small manufacturers, using less than 10 tons of rubber a month, was informed that they could disregard the percentage allowances provided they did not consume more than the customary ten tons.

Shortly thereafter, E. R. Stettinius, Jr., Director of Priorities for the O.P.M., announced that the original preference order had been amended. The amendment, reproduced in full elsewhere in this issue states that the original formula for monthly cuts in processing shall continue to apply to processors who, by volume, consume almost 80% of all domestic rubber. However, any processor who consumes less than his quota in any particular month may add the unconsumed amount to any subsequent quota. Furthermore, the amendment gives the Director of Priorities the right to fix a different quota for any processor at any time. It will be seen, therefore, that the amendment will be of special benefit to the small rubber manufacturer and will be of considerable aid to the medium-sized manufacturer.

We do not mean to imply that the problems of the rubber manufacturing industry have been solved. They definitely have not. Further changes will be made in the curtailment program as now constituted. Greater demands will be made on the industry by the defense program, with corresponding allowances as to the amount of rubber to be consumed. Certain rubber goods intended for civilian use alone will become scarce and may even disappear temporarily from the market. But the men behind rubber control now in government service are not theorists. Most of them are practical workers, grounded in the school of rubber manufacturing. Rubber will be conserved and the emergency stockpile accumulated, but with the least possible disturbance to the industry.

CURRENT NEWS OF THE MONTH

RUBBER RESERVE CO. SETS PRICE OF RUBBER AT 22½ CENTS PER POUND; CHANGES MADE IN CURTAILMENT PLAN TO AVOID DISLOCATION OF INDUSTRY

THE Rubber Reserve Company, which became the sole importer of crude rubber from the Far East into the United States by government decree on June 21, a move made to conserve as far as practical the available supply of rubber both for defense and commercial requirements, will make such rubber available to the rubber manufacturing industry at a price of 22½ cents per pound for No. IX ribbed smoked sheets, at the dock or warehouse, New York City, with appropriate differentials for other types and grades, according to an announcement by Jesse Jones, Federal Loan Administrator, on August 6. The price set was considered necessary to cover the over-all cost, and was concurred in by Leon Henderson, Director of the Office of Price Administration and Civilian Supply, which cooperates with the OPM.

Due to the uncertainty over the Far Eastern situation, the shipping situation, the need to conserve rubber in the United States, and the general upward tendency in the commodity index, the price of 22½ cents a pound is not considered high by any means, although the difference between that price and the price at which the Rubber Reserve Company is buying rubber is considered too wide a margin in some rubber circles. On the other hand, it is pointed out that rubber was selling at much higher prices only a few months ago with less disturbing elements in the picture.

Stockpile Now 225,000 Tons

In the announcement setting the crude rubber price, Mr. Jones revealed that the stockpile owned by the Rubber Reserve Company as of August 6 amounted to 225,000 tons. In addition to this amount, the rubber manufacturing companies have a somewhat larger supply on hand than they usually carry. However, now that the reserve company is the sole importer of all rubber from the Far East, and the consumption of rubber in this country has been curtailed, the stockpile should increase rapidly—providing hostilities do not break out in the Far East.

The amount of rubber which each manufacturer will be able to secure from the Rubber Reserve Company will be governed by orders issued by the Office of Production Management, according to word from Washington. Certificates will be issued to each company showing how much rubber each company can use monthly and the total sold to the company will be kept within this figure. Whether manufacturers will be permitted to conserve present inventories through the use of the reserve company's stocks has not yet been determined.

Authorities of the reserve company, however, do not believe that inventories will present any great problem. They anticipate that most manufacturers will be willing to utilize a large part of their present inventories. It is stressed, nevertheless, that any manufacturer who does not use his allowable allotment from the government agency will be prohibited from assigning it to any other manufacturer.

Sales by the Rubber Reserve Company to rubber manufacturers will generally be made through regular rubber dealers, officials have stated. In the case of large manufacturers, some sales will be made direct. Smaller manufacturers, after they have secured their certificates, will buy through established dealers in practically the same manner as heretofore. Total sales will be limited to approximately 60,000 tons a month, a figure based on the needs estimated by the OPM. Imports, barring new developments in the Far East, should reach between 90,000 and 100,000 tons a month.

Quotas Are Adjusted

In an effort to avoid threatened unemployment and to make other adjustments deemed desirable to prevent hardships for small processors of rubber, E. R. Stettinius, Jr., Director of Priorities of the OPM, made several changes in the quota system devised for the curtailment program, both for the month of August in particular and in the original preference order in general.

For the month of August, about 144 large manufacturers, representing approximately 90% of the total consumption, were informed that no changes were being made in their cases and they would be expected to live up to the quota set in the original preference order, *i.e.*, enabling them to use only 94% of the monthly average they consumed in the twelve-month period ended March 31, 1941; some 247 companies, which consumed less than 10 tons a month during that twelve-month base period, were informed that they need not observe the stipulated cut for August, provided they did not consume more than 10 tons of rubber in that month; while about 86 firms, most of them engaged largely on defense work, were sent telegrams giving them special adjustments for the month.

On August 6, Mr. Stettinius announced that the original rubber order (General Preference Order M-15) had been amended to provide for adjustments for certain processors during the balance of 1941. The amendment states that the original formula for monthly cuts in processing (RUBBER AGE, July, 1941, pp. 253-54) shall continue to apply to processors who, by volume, consume almost 80% of the available rubber.

Reasons Behind Adjustments

Among reasons advanced for the necessity of making general adjustments were the following: (1) Special conditions which affected some processors' rate of consumption during the base period specified in the original order; (2) The relative importance to national defense and essential civilian activity of products manufactured by certain processors; (3) The dislocation of labor and resulting unemployment in some instances. The amendment follows:

AMENDMENT TO GENERAL PREFERENCE ORDER NO. M-15 TO CONSERVE THE SUPPLY AND DIRECT THE DISTRIBUTION OF RUBBER

(a) Section 940.1 (General Preference Order No. M-15) is hereby amended as follows:

(1) Paragraph (c) (1) of said section is hereby amended to read as follows:

"(c) (1) Except as hereinafter provided, each Processor of Rubber shall, during each calendar month of the second half of the year 1941, limit his total consumption or processing of Rubber, including that obtained from the Rubber Reserve Company, from his own inventory or from any other source, to an amount (hereinafter termed his "quota") not to exceed the following percentages of his average monthly consumption or processing of Rubber from all sources during the

CARBON PERCENTAGES...

Where Now?

IS the fullest application being made of the easily available domestic colloid Micronex in view of the present limited supply of the imported colloid crude rubber?

MICRONEX

Beads or Compressed

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BINNEY & SMITH CO., *Distributor* • COLUMBIAN CARBON CO., *Manufacturer*

HIGHER MICRONEX LOADINGS

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In tread rubber, carbon dosages up to approximately 55 per cent have been proven by practical experience. To increase the carbon loading would obviously effect an important saving in crude rubber. Can it be done successfully? The answer lies partly in tire design and processing procedure—partly also in the choice of the grade of carbon black employed.

The history of carbon reinforcement in rubber is a progressive story of increased loading. At the present time reduced availability of crude rubber poses a challenge not only to the rubber but also to the carbon black industry. We believe it can, in general, be met with a higher average loading of Standard Micronex. However, our Technical Service Department will be glad to cooperate in determining the type best suited to your particular situation.

BINNEY & SMITH CO.
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MANUFACTURER

MICRONEX MEANS MORE MILEAGE

twelve months period commencing on April 1, 1940, and ending on March 31, 1941:

July	99%
August	94%
September	89%
October	84%
November	82%
December	80%

Provided, however, that a Processor who consumes or processes less than his quota in a particular month may add the amount so unconsumed or unprocessed to any subsequent quota or quotas. Provided, further, that by special directions issued to a Processor, the Director of Priorities may fix a different quota for such Processor during a stated period. Directions other than those to permit the satisfaction of defense requirements, direct and indirect, will be issued by the Director of Priorities in accordance with any Civilian Allocation Program issued by the Office of Price Administration and Civilian Supply, or with any modification thereof which said Office may make from time to time.

(b) This Amendment shall take effect on the 4th day of August, 1941.

Some Other Developments

Other developments of interest in connection with the general crude rubber situation, occurring in the past thirty days, included the following:

On July 14 the Office of Production Management drove another spike into its rubber priority structure by putting rubber on the "critical defense" list. This action automatically makes rubber subject to preference ratings by the Army and Navy and sets a definite limit on the amount which may be used for civilian production.

The serious menace to the rubber trade of London, occasioned by the introduction by the government of an import monopoly, was relieved in mid-July when the Ministry of Supply announced its decision to pay dealers a commission of ⅛d a pound for rubber bought through such dealers. The Ministry was believed to have made its decision based on post-war interests while meeting war-time necessity.

A central rubber export bureau has been formed in the Netherlands East Indies to maintain all intermediaries connected with exports. As a result, it is pointed out, a single buyer will be unable to deal direct with producers to avoid the payment of brokers' fees and other commissions.

Joins OPM Rubber Division

H. V. Browne, former manager of office standards for the B. F. Goodrich Co. at Akron has been named assistant to Dr. H. S. Rogers, chief of the rubber commodities division of the Office of Production Management. He was expected to assume his new duties by mid-August.

Coming Events

Sept. 11-12. Rubber Division, A.C.S., Ritz-Carlton Hotel, Atlantic City.

Oct. 3. Boston Rubber Group, University Club, Boston, Mass.

Oct. 7. Los Angeles Rubber Group, Mayfair Hotel, Los Angeles, Cal.

Oct. 11-14. National Association of Waste Material Dealers, Fall Convention, San Francisco, Cal.

Oct. 12-15. American Society of Mechanical Engineers, Fall Meeting, Louisville, Ky.

Nov. 3-5. American Institute of Chemical Engineers, Annual Meeting, Cavalier Hotel, Virginia Beach, Va.

Dec. 1-6. 18th Exposition of Chemical Industries, Grand Central Palace, New York City.

Apr. 20-24. 103rd Meeting, A.C.S., Memphis, Tenn.

CLAIMS MILKWEED RUBBER SUITABLE FOR GAS TANKS

William A. Sharpe, Alhambra, California, inventor and research specialist, graduate of the University of Michigan and of the State School of Mines at Golden, Colorado, after five years of experimentation is satisfied that he has produced from milkweed a rubber perfectly adapted for bullet-proof gasoline tanks.

With a view to founding a new California industry a group of Los Angeles businessmen is now making representations to the government in Washington to obtain initial subsidies for the national defense project. One of those heading the project is a department store executive. Another interested is H. G. Kellerman, a Los Angeles geophysicist.

Experiments conducted at a small plant late in July proved to the satisfaction of newspapermen that the product did the work. A tank covered with the rubber failed to leak after several bullets were fired through it by the newspapermen. Mr. Sharpe gave other demonstrations to prove that he has produced a rubber more resistant to fire, cold and gasoline than tree rubber. Samples were shown which the inventor asserted had been immersed in gasoline for one year without decomposition.

Briefly stated, the vats of milkweed milk are innoculated with certain forms of bacteria and the product is converted into rubber by fermentation. "When one realizes the part bacteria play in other types of manufacture", Mr. Sharpe says, "it is not at all surprising that certain strains of bacteria can produce rubber when cultures are placed in vegetable milk. The bacteria multiply and eat the starches finally converting much of the milk content into protein.

"If air conditioning is watched carefully fully ninety per cent of the milk is converted into various grades of rubber. The cream is skimmed from the tops of the vats and consists of an extremely elastic form of latex. This cream forms in two days after the vats have been cultured.

"One of the most important ways in which milkweed rubber differs from tree rubber is in its protein content. Whereas tree rubber contains less than 6 per cent of protein the protein content of our milkweed rubber can be built up to 47 per cent. It is high protein content that gives added pliability and increased resistance to heat and cold."

Immense Supplies Available

A three months survey by two men indicates that there are at least 27,000 acres of milkweed going to waste in one part of California alone. There are 1,000,000 tons of milkweed available from which it is estimated that 50,000 tons of rubber can be made by Mr. Sharpe's process. Milkweed suitable for rubber grows wild in seven western states.

The inventor is satisfied that sufficient rubber could be produced from wild and cultivated milkweed to supply the nation in war time even though all importations of tree rubber should stop.

Under the small production system used in Mr. Sharpe's little plant the rubber was produced at very low cost. It cost only $4 per ton to have the weeds delivered to the presses and each ton of weeds produced 100 pounds of rubber. More than 1,000 pounds have to date been produced and tested.

Mr. Sharpe is 60 years of age and is the holder of more than 400 patents secured as the result of a lifetime of research.

Appoint Zinc Committee

A special committee on copper and zinc to advise government defense agencies on production, priorities, purchasing and labor problems associated with such materials, was named by the Office of Production Management on August 7. Included among the 33 members named to the committee were the following: F. E. Chesney, American Steel & Wire Co.; Marshall L. Havey, N. J. Zinc Co.; Irwin H. Cornell, St. Joseph Lead Co.; Howard I. Young, American Zinc, Lead & Smelting Co.; W. E. Sprackling, Anaconda Wire & Cable Co.; D. R. G. Palmer, General Cable Corp.; Everett Morss, Simplex Wire & Cable Co.; F. C. Jones, Okonite Co.; and C. A. Scott, Rome Cable Corp.

Additional orders for rubber tracks of the type now used by the Army on high speed military vehicles have been received by Goodrich. The expenditure involved is in excess of $3,500,000 and is the second track order of substantial size awarded to the company.

RECLAIM OF SYNTHETIC RUBBER IS GOAL OF SOVIET INDUSTRY

Efforts for the development of a method to reclaim synthetic rubber on a commercial scale by Soviet authorities are now being made, according to the Department of Commerce. A pilot plant put into operation by the Soviet Union in the latter part of 1940 is said to have reclaimed synthetic rubber by the so-called method of dissolution quite successfully.

Reference to the operation of the pilot plant was recently made in the Russian journal, *Kauchuk e Rezina*. While the magazine article gives no details concerning the method referred to, it states that technical and organizational difficulties were gradually surmounted and that by February, 1941, the plant succeeded in overfulfilling its plan assignments. The physical and chemical properties of the reclaimed rubber obtained by the method mentioned have been found to be very satisfactory, and it is stated that in the case of rubberized textile fabrics produced therefrom, better results have been obtained than were realized during laboratory work in the course of the period of experimentation.

Experimental trials carried out at an artificial rubber sole factory with the new product are reported to have demonstrated that it is of sufficiently high quality so that they can be manufactured entirely from the reclaimed article. Thus far, the rubber reclaimed from used synthetic rubber (mostly automobile tires) has been utilized in the manufacture of rubber soles and of artificial leather.

The present Soviet output of reclaimed synthetic rubber is small, but the favorable results thus far obtained are stated to have dispelled any doubt of the practicability of the utilization of this method for the production of reclaimed synthetic rubber on an industrial scale. The article further states that a number of new plants will be set up, on the basis of the experience acquired at the pilot plant, and that the machinery and processes used will be further perfected.

Albacer Synthetic Wax

Hard rubber and plastic articles can now be polished more economically and more efficiently by means of a new synthetic wax, according to the Glyco Products Co., Inc., Brooklyn, N. Y., developers of the new wax. Known as Albacer, the new wax replaces carnauba wax used for this purpose, where a non-aqueous solvent is employed.

Pliofilm is now being used in the odor-proof packaging of smoked herring, smoked salmon, fillets and other fish products, according to the Pliofilm Division of the Goodyear Tire & Rubber Co. It is also being used in the packaging of pickled fish in brine.

All-Rubber Airplanes

Cliff Slusser, vice-president of the Goodyear Tire & Rubber Co., has revealed that the British are using decoy planes of rubber, inflated like balloons, to lure enemy raiders into wasting bombs. Mr. Slusser stated that Goodyear had built full-size "planes," with exteriors resembling those of fighting ships, of rubber. Reports from the Russian-German front indicate that the Germans are using all-wood planes for the same purpose.

Increase Tire Prices 5%

With the approval of the Office of Price Administration and Civilian Supply, the major tire manufacturers increased prices on their lines by approximately 5%, effective August 1. In making revisions in the price schedule, the tire manufacturers lifted the excise tax, amounting to 53 cents on a 6:00 x 16 tire, out of the list price and added 2.4% to the list. Because discounts to dealers will now be figured on the net list, minus tax, the actual increase to the dealer is approximately 5%. There is no justification for any increase to the consumer beyond a proportionate share in the 5% increase in wholesale costs, according to Leon Henderson, Price Control Administrator, despite statements issued by the rubber manufacturers to the effect that the 5% increase was but a fraction of increased production costs which in some cases have gone up as much as 10%.

Seiberlings Lose Appeal

The Appellate Court, sitting in Cleveland, on July 17 upheld a ruling which favored Edgar B. Davis in a $643,000 suit brought by relatives of Frank A. Seiberling, founder of the Goodyear Tire & Rubber and the Seiberling Rubber companies. By a 2 to 1 decision the court found that the Seiberlings have no claim to assets of the Ohio Goodyear Securities Co., formed by Mr. Davis after he had made a $500,000 loan to Mr. Seiberling when the latter was in financial difficulties over control of Goodyear.

Revise Prices on Hycar O.R.

Effective August 1, the price of Hycar O.R., the oil resistant variety of the synthetic rubber manufactured and sold by the Hydrocarbon Chemical & Rubber Co., of Akron, Ohio, was reduced to 70c per pound for 100 pounds or more, 80c for 26 to 99 pounds, and $1.00 for 1 to 25 pounds. These prices are net, f.o.b. Akron, and all orders are accepted subject to prior sales and government regulations. Special discounts are earnable on contracts.

ACCIDENT RATES IN INDUSTRY REVEALED BY SAFETY COUNCIL

Accident rates in the rubber industry for the year of 1940, just released by the National Safety Council, reveal that the rubber industry ranked 8th in frequency among 30 major industries, its rate of 8.27 being 34% below the average of 12.52 for all industries, while it ranked 5th in severity, rubber companies averaging 0.65 for severity against 1.44 for all industries.

The 1940 experience of the industry is based on reports from 55 plants, whose 72,000 employees worked 133,906,000 hours during the year, the largest coverage ever reported to the Council.

Rubber company frequency rates averaged 1% below 1939, but severity rates averaged 19% higher. The small reduction in frequency is slightly better than the unchanged average for all industries, but the sharp increase in severity compares unfavorably with the general reduction of 1%. This is the fourth severity increase reported for the rubber industry in the last five years. The cumulative reduction since 1926 is, however, 48%.

Large plants continued to have the lowest frequency rates, averaging 7.69 for 1940. Small units again had the lowest severity rates, averaging 0.48. Small plants reduced rates in comparison with 1939 and also led in improvement from 1932 with reductions of 13% in frequency and 32% in severity. Footwear plants again had the lowest injury rates in the industry, averaging 3.45 for frequency and 0.11 for severity. Only tire manufacturing plants had lower frequency rates for 1940 than for 1939. Severity rates decreased only in footwear plants.

Reports covering fatalities and permanent partial disabilities occurring during the last seven years in the rubber industry show that the principal mechanical causes of such injuries were unsafe processes, poor housekeeping, and improper guarding. The principal personal causes were disobedience of instructions and other improper attitudes.

Perbunan Price Reduced

Announcement was made on July 17 by the Chemical Products Department of Stanco Distributors, 26 Broadway, New York City, that the price of Perbunan, produced by the Standard Oil Co. of New Jersey, had been reduced from 85c to 70c per pound. At the same time it was revealed that until recent weeks the Standard Oil Co. of Louisiana had been unable to obtain a supply of butadiene sufficient for its planned production of synthetic rubber, but that the plant is now operating at its designed capacity of 1,800 tons per year. Construction work on additional facilities is now being rushed and it is believed that the plant will be turning out 300 tons a month, double present capacity, early in 1942.

RUBBER MANUFACTURERS ACTIVE IN NON-RUBBER DEFENSE WORK

Leading manufacturers in the rubber industry are playing an ever-increasing role in the defense program, not only in connection with rubber products essential to the fulfillment of that program, but also in the production of non-rubber goods. Goodrich, Goodyear, U. S. Rubber and Firestone are among such companies.

Organization of the Lone Star Defense Corporation, a subsidiary of the B. F. Goodrich Co., to engage immediately in the construction and operation of a government ordnance plant to be established near Texarkana, Texas, was announced on July 29. The contract for the management and operation of the plant, to be known as the Lone Star Ordnance Plant, was issued to the new corporation the same day.

The total estimated cost under the contract is $78,940,000, of which approximately $33,500,000 will be used for construction of the plant and equipment, while the sum of $45,440,000 is allocated for the training of personnel, for one year's operation, and for one year's capacity output.

The plant is a shell loading plant, and will load several types of artillery and howitzer shells, as well as bombs, detonators and artillery primers. Approximately 8,000 will be employed.

Joseph C. Herbert, who has been manager of the Goodrich plant at Los Angeles since 1936, has been named assistant secretary of the new defense company, while Arthur Kelly, who has been general superintendent of Mill 4 at Akron, becomes general manager of the new plant. J. E. Gulick, manager of the interplant operations department at Akron, has been named factory manager of the Los Angeles plant to succeed Mr. Herbert, while Fred A. Nied succeeds Mr. Kelly at Akron.

Other appointments made by Goodrich in connection with the operation of the new ordnance plant include the following: Kenneth R. Huffman, manager of the tire cost department at Akron, will act as controller; Arthur C. Sprague, manager of the labor department, will be personnel superintendent; J. W. Frasche, purchasing agent at Los Angeles, becomes purchasing agent for the new company; C. E. Jones, plant engineer at Oaks, Penna., will be chief engineer; William B. Thompson, manager of the industrial engineering department, will act as construction engineer.

New Airplane Parts Factory

Goodyear took another step forward in the defense program when it announced on July 28th that the Goodyear Aircraft Corp., a subsidiary, will shortly erect and operate a large plant for the manufacture of airplane parts at Litchfield Park, Arizona, which is 15 miles west of Phoenix. The plant, requiring an investment of more than $500,000 exclusive of equipment, will be strategically located to serve the aviation production centers of the west coast and Texas.

Goodyear has greatly expanded its facilities and organization for the production of aircraft parts in recent months and is currently making tail surfaces, ailerons and similar sub-assemblies for such plane manufacturers as Glenn L. Martin, Curtiss-Wright, Grumman and Consolidated. New plants which will employ an estimated 9,000 persons are now being rushed for the aircraft subsidiary in Akron and are expected to be completed within three months.

U. S. Rubber in Picture

Shortly following approval of the company's stockholders to change the original charter and thus enable the company to make miscellaneous products beyond the charter's original scope, the U. S. Rubber Co. was granted an $86,058,331 contract by the U. S. Army for the management, operation and construction of a small arms ammunition plant at Des Moines, Iowa. The contract provides funds for the purchase of tools, equipment and machinery and $57,500,000 as payment for the first year's output at capacity load. The plant, which will be owned by the Army, will make .30 and .50 caliber ball, tracer and armor-piercing ammunition.

C. L. Wanamaker, now factory manager of U. S. Rubber's Mishawaka (Ind.) plant, has been appointed production manager of the new ammunition plant which is expected to get under way early in 1942. Mr. Wanamaker has been with U. S. Rubber for more than 25 years and came to the Mishawaka plant as factory manager in 1932. Charles L. Glaes, general superintendent of the Mishawaka plant, will take over its management.

Forms Aviation Subsidiary

The formation of the Firestone Aviation Corporation, with Leonard K. Firestone as president, and Wilbur Shaw as sales manager, was announced by the Firestone Tire & Rubber Co. on July 11. The management and operations of the new subsidiary will be centered in the Firestone plants at Akron, and will be devoted to the development, engineering, production and distribution of aircraft materials and equipment.

Products currently being turned out by the new aeronautical subsidiary for national defense and commercial uses include airplane tires, tubes, self-sealing fuel tanks, seadrome contact buoys, pilot seats, and airplane wheel and brake units. A recent development is a new channel tread tire built especially to enable combat planes to land on sandy or muddy emergency fields on which a plane would ordinarily bog down. The new tire features a concave type tread design.

General Forms Defense Concern

As the first step in an attempt to secure a contract for the management and operation of a $15,000,000 powder bag loading plant at Flora, Mississippi, the General Tire & Rubber Company formed a defense subsidiary late last month. The new firm, called the General Tire Engineering Co., was issued a charter in Jackson on July 28, with capital stock set at $25,000. Although three Jackson attorneys were the incorporators of the new concern, it was understood that title to the incorporation was to be transferred to General Tire at an early date.

Particularly useful in high-flying bombing operations are the new oxygen masks seen above, now in production at the Akron plant of American Anode, Inc.

FINANCIAL NEWS

U. S. RUBBER CO. EARNS NET INCOME OF $6,203,314

Consolidated net income of the United States Rubber Company for the six months ended June 30 was $6,203,314, equal, after preferred dividends, to $2.07 a common share. This compares with $4,234,239, or 94 cents a share, for the corresponding period of 1940. Net sales billed in the first half of this year amounted to $150,677,739, or 37 per cent above the $109,782,572 total for the first half in 1940.

Taxes on excess profits and income, including foreign income taxes, and provision for tax contingencies, estimated at $8,398,720, were 268 per cent greater than the $2,283,927 provided for in the first six months of 1940. Before deductions of these taxes, net income this year was $14,651,311, as against $7,001,117 in the same period last year.

Current assets, including cash of $17,090,831, totaled $136,189,342. Current liabilities, including provision for accrued taxes, were $51,077,989. Earned surplus was $14,872,410 after payment of full current dividends on the eight per cent non-cumulative preferred stock, and after setting aside the dividend of 50 cents a share on the common stock which was declared on March 5, 1941 to be payable April 30, 1941, but which has not yet been paid because of the suit brought by a preferred stockholder to enjoin its payment.

Referring to this suit, Mr. Davis said that "the court of original jurisdiction denied the injunction on July 3, 1941. The plaintiff has three months in which to appeal the decision."

Concerning operations, Mr. Davis reported to stockholders: "Your company has been operating practically at capacity in all of its plants so far this year. However, effective July 1, 1941, the Government has taken over the purchase of crude rubber for the entire rubber industry and has arranged for the allotment of gradually reduced amounts of rubber for consumption over the remaining months of 1941. All demands of a defense nature are being met."

B. F. GOODRICH EARNINGS SHOW AN INCREASE OF 478%

Consolidated net earnings of the B. F. Goodrich Co. for the first six months of 1941 reached $6,646,033, after provision for depreciation, interest, Federal income and excess profits taxes and a reserve of $1,000,000 for contingencies. This is a gain of 478% over the $1,362,691 reported for the corresponding period in the previous year.

The 1941 net was equal to $4.31 per share of common stock which compares with 26c a share on the 1940 earnings. Net earnings for the year of 1940 amounted to $6,109,673, or $3.11 a common share.

Consolidated net sales for the first half of the current year totalled $98,005,059, an increase of 45% over the net sales for the corresponding 1940 period, after excluding in both periods net sales of European subsidiaries which were not consolidated.

Total current assets as of June 30, 1941, amounted to $95,653,781 and current liabilities to $26,218,371, a ratio of 3.65 to 1. Inventories and raw material commitments were valued at the lower cost or market.

As is customary, the accounts for the half year were prepared by the company's accounting staff, and were not certified by independent auditors.

GENERAL TIRE & RUBBER CO. CLEARS PROFIT OF $1,004,443

General Tire & Rubber Company reports a net profit of $1,004,443 for the six months ended May 31, 1941, after all taxes and charges. This is equivalent to $1.77 per share on the common stock and compares with $280,562, or 39c a share, for the corresponding period in the previous fiscal year.

Net sales in the period covered reached $16,391,801, an increase of 61% over the sales of $10,167,972 in the 1940 period. Profit before provision for Federal income and excess profits taxes amounted to $1,854,442.

Hewitt Rubber Corporation

First Half: Net earnings of $206,774, or $1.23 per share, which compares with $102,371, or 61c a share, for the same period of 1940. Earnings before taxes amounted to $473,774, with $267,000 being put in reserve for Federal income and excess profits taxes. A statement accompanying the report reveals that the sales of bullet-sealing tanks account for approximately 20% of the company's first half year's business and currently account for approximately 40% of its volume.

Rome Cable Corporation

Second Quarter: Net profit of $120,734, equal to 64c a share on 189,830 capital shares, which compares with $60,570, or 32c a share, for the corresponding quarter in the previous year. Figures are after provision of $162,599 for estimated normal and excess profits taxes in the 1941 quarter, compared with $11,832 in the 1940 quarter.

GOODYEAR TIRE & RUBBER INCREASES ITS NET PROFIT

Goodyear Tire & Rubber Co. reports a net profit of $6,196,756 for the first six months of 1941, equal after preferred dividends to $2.23 each on 2,059,168 shares of no-par common stock, excluding treasury shares. Net profit for the corresponding period in the previous year amounted to $4,142,892, or $1.23 a common share.

Charges against this year's net profit included depreciation, interest, dividends and equity in undistributed earnings of subsidiaries not wholly owned, Federal and foreign income and excess profits taxes and $3,500,000 provision for contingencies.

The amount provided for United States income and excess profits taxes is estimated under the proposed provisions of the new revenue bill. The amount allowed is about $3,000,000 in excess of requirements under the present law, the company says.

The provision for foreign income and excess profits taxes is based on the latest available information on legislation in force in the foreign countries in which Goodyear does business.

Provision for income and excess profits taxes—United States and foreign—increased in the first half of this year to $11,483,840 from $3,086,978 a year ago.

Net sales of $152,931,046 represented the largest six-month volume in the company's history and compared with $101,055,607 for the similar period last year.

New Jersey Zinc Co.

First Half: Net profit of $5,513,900, equal to $2.81 a share, which compares with $3,318,268, or $1.69 a share, reported for the first half of 1940. Net profit for the second quarter of the current year amounted to $2,700,391, equal to $1.37 each on 1,963,264 shares of capital stock, as compared with $1,553,156, or 79c a share, for the corresponding quarter of 1940.

Monsanto Chemical Co.

Second Quarter: Net income of $1,945,977, equal to $1.40 per common share, which compares with earnings equal to 82c a share for the second quarter of 1940 after adjustment for taxes assessed later. Sales volume during the second quarter of the current year reached an all-time record of $16,075,620.

General Latex & Chemical Corp.

Nine Months Ended Jan. 31: Net income of $35,339, which compares with $28,149 for the year ended January 31, 1940. Net sales for the periods amounted to $1,519,546 and $1,711,143, respectively. General Latex & Chemical Corp. is the successor to the Vultex Chemical Co.

BOSTON GROUP OUTING ATTRACTS RECORD CROWD

Approximately 220 members and guests, the largest in the group's history, attended the annual outing of the Boston Group, Rubber Division A.C.S., held at the Weston Country Club, Weston, Mass., on Friday, July 18. Golf, tennis, bowling, soft ball and horseshoe pitching was included among the day's events. Every member received a door prize.

Winners of the golf tournament, conducted by Ed Colligan, of Plymouth Rubber, follow: *Kicker's Handicap,* James G. Grower, M. Danovitch, A. L. Perry, R. B. Woodbury and R. Patrick; *Nearest to Pin on 7th Hole,* George Wilson, W. L. Brumby, Stanley Coval; *Low Gross,* Charles Round, E. B. Curtis, Charles Hamilton; *Low Net,* James Walton, G. Greenbaum, E. Varnum; *Most 5's,* R. H. Sherman; *Most 6's,* Robert Kelley; *Most 7's,* F. H. Langhorst; *Most 8's,* J. L. Haas; *High Gross,* C. Brown; *High Net,* R. Breckenridge.

Harvey A. Hutchinson won the horseshoe pitching contest, with Samuel F. Butman as runner-up. Leon Lurie took bowling honors, with Patrick Byrns a close second. The tennis tournament went to J. H. Clarke, with D. W. Kendall runner-up. In the soft ball contest, Jimmy Geenty's Reading Bearcats beat Larry Shaw's Avon Tigers by 4 to 3.

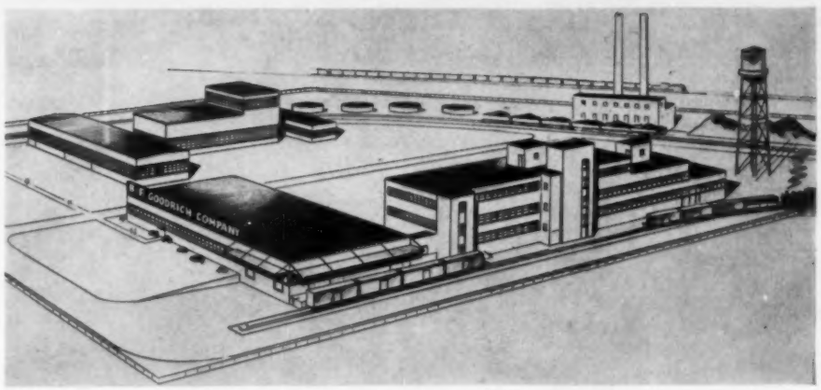
The outing was termed the best in the history of the group and special credit is due to Harry Atwater, of Hood Rubber, and Frank Ward, of Panther-Panco Rubber, co-chairmen of the event. Special thanks are also due to the numerous companies whose donations made gifts possible.

FORM HAITIAN CORPORATION TO DEVELOP AGRICULTURE

The Société Haitiano-Américaine de Developpement Agricole, the corporation through which the Haitian and United States governments will cooperate in the long-term agricultural development of the Republic of Haiti, was formally organized in Port au Prince early in August. Thomas A. Fennell, agricultural advisor to the Haitian Government, is president and general manager; Maurice Dartigue, Minister of Agriculture of Haiti, is vice-president; and C. Reed Hill, of Washington, D. C., is secretary-treasurer and assistant general manager.

The new corporation, capitalized at $1,000,000, is authorized to grow and develop rubber, oil crops, drug plants and other Haitian natural resources; to carry on experimental work in disease control and plant development; to develop methods of processing agricultural crops and promote manufacturing and handicrafts related to agriculture; and to buy and sell agricultural and manufactured products in both foreign and domestic markets.

As the first step in carrying out this program, it has been announced that rubber and banana plantations in the vicinity of Jeremie in the southern peninsula of Haiti and near Bayeux on the northern coast will be established immediately. These plantations will be staffed by United States and Haitian technicians. The corporation will enter into contracts with peasant land-owners to produce the desired crops, furnishing seeds and purchasing the harvested crops.



Sketch of the new plant for the manufacture of Koroseal now under construction in Louisville, Kentucky, by the B. F. Goodrich Co. The entire output of this production unit will be used for national defense.

Two New Latex Materials

Advance Solvents & Chemical Corp., 245 Fifth Ave., New York City, has introduced two new materials for use with latex, both especially recommended for tackifying latex adhesives. These materials are Vistac and Resin V. Vistac is a viscous, oily, synthetic hydrocarbon which is easily emulsified for addition to latex and is compatible with latex in any usable proportion. Resin V is a resin which blends in all proportions with Vistac and which can be readily emulsified with that material. The emulsified blends of Vistac-Resin V are said to possess great tackiness, and thus a very large proportion of latex in adhesives may be replaced by such an emulsion at a saving in cost and improvement in certain properties. Data sheets are available.

Auction Martin Tire Assets

A public auction sale of the land, buildings, machinery, equipment, molds, trade names, etc., of the Martin Custom Made Tire Corporation, was scheduled to be held at the plant's site in Salem, Ohio, on Wednesday, August 13. The sale was ordered by the U. S. District Court of the Southern District of New York, and was in the hands of the Industrial Plants Corp., of New York City and Toledo, Ohio. Warren A. Schenck, 251 West 57th St., New York City, is trustee for the bankrupt concern.

GOODYEAR SECURES PATENT ON SPECIAL WAR CLOTHING

Special clothing for war-time use which is said to be proof against any of the known war gases and poisonous vapors has been developed by the Wingfoot Corporation of Wilmington, Delaware, an affiliate of the Goodyear Tire & Rubber Co. The apparel, which includes trousers, coats, gloves and even gas masks, is covered in U.S. Patent 2,247,925, granted to Lorin B. Sebrell, noted Goodyear technologist and manager of that company's research department.

Such clothing effectively resists penetration by mustard gas, one of the most penetrating war gases known, according to tests made by the Chemical Warfare Service and recorded in the patent papers.

The clothing is rendered impervious to gas and vapor by coating with a film of rubber hydrochloride. This film, in turn, is coated with a non-tacky coating of rubber from latex. The double film is reported to be more effective in warding off gases than a single film of either of the two types of rubber of the same thickness.

New Bedford Plant Busy

The New Bedford, Mass., plant of the Goodyear Tire & Rubber Co., recently renovated and prepared for the manufacture of barrage balloons, rubber boats, and rubber pontoons and flotation bags used in flying land craft across the Atlantic, has sufficient orders on hand to keep it busy for months to come, plant officials stated recently. All products made at the plant are intended for government use. The fabric used in the manufacture of the plant's products is rubberized at Akron and then shipped to New Bedford in rolls. H. M. Coulter, assistant treasurer of Goodyear, is in charge of the plant. J. R. Kelley is general superintendent.

NEWS IN BRIEF

Rubber heels for field shoes have been adopted as standard equipment for the enlisted personnel of the U. S. Army. Although not a single pair of regulation Army shoes used rubber in the World War, it was recently revealed by Goodyear that the War Department has issued orders for 2,500,000 pairs of new field shoes carrying rubber heel specifications.

George Burger, formerly general manager of the National Association of Independent Tire Dealers, now acting as a consultant to the independent tire trade, with offices at 250 West 57th St., New York City, has started publication of the *National Independent*, a trade journal devoted to the retail tire trade.

The latest innovation in "Lastex" Yarn technique is stretchable shoes in smooth kid. After two and a half years of research and experimental work, Alfred Vamos, who introduced stretchable shoes five years ago, has succeeded in developing a flawless, stretchable smooth kid leather.

The development of a bullet-sealing hose, which not only protects fuel systems in airplanes from bullet punctures but also makes possible substantial weight savings in the average bomber, has been announced by Goodrich. Secret of the hose's construction is an unusually effective sealing member that prevents fuel leaks even under 10 to 15 pounds pressure and despite numerous punctures from high caliber machine gun bullets.

The Lower Rubber Mfg. Co., Ravenna, Ohio, received its largest government order recently, a contract to make outlet valves at a total cost of $12,324. The order was awarded by the Chemical Warfare Service.

A new type of footwear, with patented, non-slip sole to halt accidents, has been especially designed for workers in garages, filling stations, and auto laundries, by the U. S. Rubber Co. Known as the Sperry Top-Sider, the unusual sole was originated by Paul Sperry, an experienced yachtsman, to insure safe footing on dangerous decks.

Fabrics coated with Ameripol, the name given to its synthetic rubber, has been announced by Goodrich. Among principal applications of Ameripol-coated fabrics are diaphragm service in gas meters and regulators and their use in fuel pumps handling oil, high test gasoline, alcohol or other liquids which are detrimental to natural rubber.

Due to tremendous increase in business volume, the Wheelco Instrument Co., manufacturers of indicating and control instruments for the rubber and other industries, has moved into its own building, located at Harrison and Peoria Streets, Chicago, Ill.

The Midsummer issue of *The DuPont Magazine*, interesting house organ of E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware, carries an article stressing the importance of neoprene to the defense program under the title, "Vital to Defense."

An exceptionally large order for cord conveyor belting, totaling 25,600 lineal feet, or nearly five miles, for use in Government defense construction work at Honolulu, has been placed with the B. F. Goodrich Co.

General Electric Co., Bridgeport, Conn., has received an order to make 12,000 electrically heated flying suits for the Army Air Corps. The suits include a wired cloth boot of olive drab overcoating with molded rubber soles.

Until further notice the Rubber Manufacturers Association has suspended publication of its detailed monthly report of crude rubber importations into the U. S. by ports of entry and points of origin.

The latest issue of *The Royal Forum* (No. 15), house organ of John Royle & Sons, Paterson, N. J., manufacturers of extrusion and other machinery for the rubber and plastics industries, is devoted to defense. The part played by the company's equipment in defense work is also stressed.

Ninety per cent of all radiator hose replacements can be made now with six sizes through the use of its new Multi-Flex Hose, according to the U. S. Rubber Co. Multi-Flex, a wire inserted radiator hose, will work on installations covering all types of bends.

Titanium Pigment Co., New York, manufacturers of titanium pigment products for the rubber, paper, paint and other industries, has approved plans for the construction of a new plant at Tehawus (Essex County), N. Y. The new plant will include several large production units.

A new vulcanizing oven, which uses hot air instead of steam for curing rubber coats, has been installed in the plant of the A. B. Zuckert Co., Milwaukee, Wisc. It attains maximum heat of 250° F. in 45 minutes.

Goodyear Introduces Hydro-Tire

The Hydro-Tire, a new development in farm tires, recently announced by the Goodyear Tire & Rubber Co., Akron, makes possible the complete filling of tires for farm use with water, which is said to result in important economies and increased product performance. Among advantages claimed are increased traction at no extra cost as a result of the increased volume and weight of water, reduction of bounce on rough ground, reduction of sidewall buckle breaks, and tires inflated 100% with water require practically no attention since water will not diffuse through the rubber as does air. Goodyear has perfected means of water-inflating farm tires without inner tubes, as well as a method providing for full water-inflation of tires containing inner tubes. The three essentials to water-inflating tires 100% without inner tubes are proper mounting, a special valve fitting for the rim, and a mechanical means for bleeding all air from the tire during the process of water inflation.

Beater Bar for Cylinders

Newly developed processes for bonding rubber to metal are helping many machine manufacturers improve the efficiency and durability of their products by eliminating metal-to-metal contacts in vital machine parts. For example, the Ohio Rubber Co., Willoughby, Ohio, was recently granted a patent covering a beater bar for combine cylinders. In the application of this bar, rubber is bonded to metal parts which combine to remove the kernels of grain or seed from the heads or pods. Rubber-to-rubber contact, in this case, makes possible the harvesting of more than 100 different grain, seed and bean crops. One of the many improvements is the special molded shape of the rubber, bonded to the bars of the threshing cylinder. This application makes possible the safe and efficient harvesting of the tiniest seeds and the largest beans. The new beater bar is covered by U. S. Patent No. 2,212 300.

Gillette Tire Division of U. S. Rubber has announced three new passenger car tires, two new truck and bus tires, and a complete new line of tubes. Two of the passenger car tires, one of cotton and the other of rayon, feature spiral-grip safety treads, and were designed for the premium market which demands greater safety, long mileage, and smart styling.

Rubber soles and heels of light weight which resist skidding when wet and insulate shoes against hot pavements are covered in a recent patent issued to Ernest W. Dunbar and assigned to the Cambridge Rubber Co. The claimed properties are imparted by the incorporation of cork into the rubber mix.

NAMES IN THE NEWS

S. C. "STILLEY" STILLWAGON, editor of the *India Rubber World* for the past three and one-half years, has resigned that post to join the Hodgman Rubber Co., Framingham, Mass., in an executive capacity. His duties on the *World* have been assumed by EDWARD V. OSBERG, formerly associate editor.

FRANK W. DELUCA has sold his interest in the Empire Rubber Corporation, of Worcester, Mass., and advises that he is no longer connected with the company in any capacity. The company manufactures proofed goods.

REID L. CARR, president of the Columbian Carbon Co., has been elected a director of the Irving Trust Co. of New York City. MR. CARR became president of Columbian Carbon in 1940.

T. W. MILLER, who recently retired from active duties with the Faultless Rubber Co., Ashland, Ohio, of which he was the founder, was honored at a dinner party on July 17 by a group of older employees of the company who had been associated with him for many years.

JAMES H. CONNORS, vice-president in charge of mechanical goods, B. F. Goodrich Co., Akron, returned to his office early this month for the first time since he was injured in a traffic accident last April.

WILLIAM B. DAVIES, formerly with the Gates Rubber Co. and more recently associated with the Schacht Rubber Co., of Noblesville, Ind., has joined the Thiokol Corp., Trenton, N. J., and will represent that concern in the midwest, with headquarters at Detroit.

EARL H. BARDER, superintendent, tire division, B. F. Goodrich Co., Akron, has taken an extended leave of absence for reasons of health. One of the best known members of the Goodrich organization, he has been general superintendent of the tire division since 1927. He will spend the next few months in Florida.

PAUL FIELDEN, credit manager of the Norton Co., Worcester, Mass., has been named director of purchases for the company. JOHN MILLER succeeds him as credit manager.

HOWARD W. JORDAN, vice-president and comptroller of Montgomery, Ward & Co., with whom he was associated for 30 years, has left that company to assume the presidency of the Pennsylvania Rubber Co., Jeannette, Penna., succeeding A. C. BOWERS, who recently resigned.

THOMAS F. BURNS, international vice-president of the United Rubber Workers of America, is one of a group scheduled to leave for England shortly to investigate and report on war-time conditions as they affect labor. Details of the trip are being kept secret.

WILLIAM L. FINGER, assistant secretary of the Rubber Manufacturers Association, who has spent considerable time in Washington lately on defense work, has resigned from the Association to devote more of his time to such work. At present, MR. FINGER is chief consultant of the Rubber Unit of the Office of Production Management.

BENJAMIN T. MOFFAT, eastern division manager of the Hewitt Rubber Corp., Buffalo, N. Y., was elected a vice-president of that company on July 22. He will continue to make his headquarters at the company's New York office, 70 Pine St.

FRANCIS B. WHITE, of the Foster Wheeler Corp., has been elected president of the Junior Chemical Engineers of New York City. HOWARD TEN BROECK, of the Socony Vacuum Oil Co., was elected vice-president.

DONALD B. STEWART has been named manager of the general chemical laboratories of the B. F. Goodrich Co., Akron, succeeding VICTOR E. WELLMAN, who has been appointed technical assistant in the general factory administrative department, a new post.

ORAL B. WRIGHT has been appointed director of sales and advertising for the David J. Ross Co., Benton Harbor, Mich., manufacturers of punch presses and other production equipment.

B. E. STEWART, who joined the Jones & Laughlin Steel Corp. as head chemist of the by-product laboratory in 1937, has been named manager of by-product sales for that concern.

M. C. WHITAKER, vice-president, American Cyanamid Co., New York City, has again been named as chairman of the Advisory Committee for the 18th Exposition of Chemical Industry, which is to be held in Grand Central Palace, New York, December 1 to 6.

CHARLES B. O'CONNOR, general sales manager of the replacement tire division of the B. F. Goodrich Co., Akron, has taken an extended leave of absence due to reasons of health. He expects to spend the summer months on the Atlantic Coast with his family.

Changes Made at Goodrich

Three important changes in the executive staff of the tire division of the B. F. Goodrich Co., Akron, were announced last month by T. G. Graham, vice-president in charge of factory operations. K. D. Smith, the division's technical superintendent for the past nine years, was named assistant to Mr. Graham, representing his office on special technical assignments; A. W. Phillips, was appointed general superintendent; and Harold Gray, well known for his work with the Crude Rubber Committee of the Rubber Division, A.C.S., assumed the post of technical superintendent.

K. D. Smith

JEROME C. HUNSAKER, head of the mechanical engineering department of the Massachusetts Institute of Technology, and formerly vice-president of the Goodyear Zeppelin Corp., has been appointed coordinator of research and development for the U. S. Navy.

E. K. BOLTON, chemical director of E. I. du Pont de Nemours & Co., Wilmington, Del., intimately associated with the development of neoprene, has been elected by the Society of Chemical Industry to receive the Chemical Industry Medal for 1941.

A. C. WARE, formerly Atlanta District Sales Manager for the Footwear Division of the U. S. Rubber Co., and associated with that company for the past 22 years in various branches, has been appointed Manager of Sales Development of the division. He will maintain headquarters in New York.

The Sixth Annual Convention of the United Rubber Workers of America will open in Indianapolis, Ind., on September 15. Meetings will be held on the roof garden of the Hotel Severin.

CANADIAN NEWS

Dominion rubber circles are somewhat at a loss to know what inspired rumors and queries from New York late last month in regard to formation of a rubber reserve company in Canada.

Early this year the government at Ottawa established the Fairmont Company, Ltd., to build up a rubber reserve in the Dominion. (*Cf.*, RUBBER AGE, February, 1941). If this government-established commodity company is to be superseded by some other organization or if strict rationing is to be imposed similar to that in effect in the States, no announcement has yet been made of it.

The rubber supply is not directly affected by the difficulties with Japan since all supplies of crude used in the Dominion come from Malaya or the Netherlands Indies. Any threat which might arise is one that has long been recognized, that is, the threat to transportation. Up to the present time Canada has been getting crude regularly and substantial stocks are said to have been built up within the Dominion. These are believed to be sufficient to keep the industry running for some months.

Canada continues to acquire shipment supplies of rubber. Recently the Dominion has paid about ⅛ cent a pound above the 18½ cents f.o.b. Singapore at which the U. S. Rubber Reserve Company does its buying.

Imports of crude rubber into the Dominion for May of this year were nearly double those of a year ago, amounting to 12,536,317 pounds compared with 6,961,021 pounds for the same month in 1940. Imports for the first five months of the year total 49,437,563 pounds compared with 38,651,615 for the first five months of 1940, an increase of 27.9 percent.

The Canadian rubber industry is well represented on the Executive Council and on the various standing committees elected by the Canadian Manufacturers Association at the seventieth annual general meeting held this summer at the Seigniory Club, Montebello, Quebec.

As a past president of the Association, W. H. Miner, of the Miner Rubber Company, Granby, Quebec, was appointed to the Executive Council. Mr. Miner was president of the C.M.A. in 1931. Others elected to the Executive Council were William H. Funston, president of the Firestone Tire and Rubber Company of Canada, Hamilton, Ontario; A. G. Partridge, president of the Goodyear Tire and Rubber Company of Canada, New Toronto, Ontario; and James I. Simpson, president of the Dunlop Tire and Rubber Goods Company, Toronto.

L. L. McMurray, of Gutta Percha and Rubber, Toronto, and H. S. Ireland, of the Canadian General Rubber Company, Galt, Ontario, were elected to the Tariff Committee. Mr. McMurray was also elected to the Commercial Intelligence Committee along with Mr. Funston, of Firestone, and J. A. Eltherington, of Goodyear. Norman Boyd, Gutta Percha, and W. C. Thompson, Goodyear, were elected to the Transportation Committee.

T. M. Mayberry, Firestone, was elected to the important Legislation Committee. Mr. Mayberry and Mr. Miner were also elected to the Industrial Relations Committee along with E. H. Koken, of Goodyear, and F. A. Warren, of Gutta Percha. Mr. Warren was also elected to the Insurance Committee. F. L. Freudeman, Sterling Rubber Company, Guelph, Ontario, was elected to the Membership Committee. G. W. Sawin, of the B. F. Goodrich Rubber Company, Kitchener, Ontario, was elected to the Publishing Committee.

Applications for membership in the Canadian Manufacturers Association have recently been approved for J. G. Smith, of the Tillotson Rubber Company, St. Johns, Quebec, and for J. A. Martin, Dominion Rubber Company, Kitchener, Ontario.

The Northern Rubber Company, Ltd., Guelph, Ontario, closed its factory on May 30. The company announced that this decision was made because conditions prevailing in the rubber footwear industry have been unfavorable for some years.

Arrangements have been made so that the company's requirements of footwear will be produced by another manufacturer. Customers will be supplied without interruption as all Northern's branches and its sales organization will be continued. The head office and warehouse will be maintained at Guelph.

A. A. Reid has been appointed resident representative for the Mechanical and Sundries Division of the Dominion Rubber Company for the Northwestern Ontario and Lakehead districts. Mr. Reid has had many years experience in the rubber industry in various parts of Canada.

Yvan Beausejour, Montreal district credit manager for the B. F. Goodrich Rubber Co. of Canada, Ltd., was elected president for the coming year at the annual meeting of the Quebec Division of the Canadian Credit Men's Association.

John L. Collyer, president of the B. F. Goodrich Company, recently was a guest at the Canadian plant in Kitchener, Ontario. During his visit Mr. Collyer presented fourteen Canadian employees with twenty year service pins.

The Firestone Tire and Rubber Company of Canada, Ltd., operates a "78 ton thermos bottle on wheels" at its Hamilton, Ontario, plant. This device is a 31½ ton engine which stores up enough steam power in fifteen minutes, using exhaust steam from the company's electric power plant, to enable it to switch railroad cars around the factory for three hours. The fireless engine can attain a speed of sixteen miles an hour pulling ten loaded cars.

Shawinigan Chemicals, Ltd., a subsidiary of Shawinigan Water and Power Company, is reported to be planning erection of a plant for the manufacture of polyvinyl chloride.

The plasticized form of this polymer is in great demand at the present time for covering degassing and other cables. The material is not now made in Canada although articles have been fabricated by Canadian rubber manufacturers from polyvinyl chloride imported from the States. At present the demand is such and manufacturing facilities so limited that the material is difficult to obtain.

Determination to produce the polymer in Canada arose from the fact that the acetylene required is available in quantity at Shawinigan Falls. The new plant is expected to be in operation early in 1942.

Nears Fiftieth Anniversary

The recent celebration of its golden anniversary by the City of Barberton, Ohio, brought to light the fact that the Aluminum Flake Company, one of the city's outstanding industries, will observe its own golden anniversary in another two years. The company was organized in 1903 by the late Frank Reifsnider who, several years before, had discovered that a piece of ore on his Missouri ranch was actually a hydrated aluminum silicate of average 99% purity. Years of hard work were spent convincing the rubber industry of the value of this new material as a compounding ingredient, but today it is accepted as one of the standard mineral reinforcing agents.

United Carbon Holds Outing

Approximately 500 employees of the various gas and carbon black plants of the United Carbon Company attended the Employees Annual Outing, held at the 4-H Fair Grounds near Charleston, West Virginia, on August 8. It was one of the largest outings yet held by the company and fun and frolic were the rules of the day.

LOS ANGELES NEWS

Bill Shawger, plant superintendent for the Rubbercraft Corporation of California, spent half of August on his vacation in San Diego County.

Jim Stull, who has been connected with the production departments of several different rubber plants in Los Angeles, is the new night foreman for the W. J. Voit Rubber Corporation.

The W. J. Voit Rubber Corporation is completing a new frame warehouse building and canopy for automobile parking of a limited number of automobiles.

The Mitchell Tire and Rubber Corporation, 2130 San Fernando Road, Los Angeles, a firm manufacturing camelback for retreading tires which it rebuilds for re-sale largely through service stations, has completed a large addition to its business home. The new sheet metal building gives the firm 15,000 additional square feet of floor space and a frontage on the street of more than 400 feet.

Work has also been completed on a new de-hydrating room for drying tire carcasses before retreading. This room with space for 500 tires at each filling makes possible even in the wettest weather a continuous daily output. The output for some time has averaged 432 tires per day, considered the largest on the Coast.

Although carcasses are gathered from points as far north as Portland by truckers who sell only to this corporation yet distribution has so far been confined strictly to the state of California where now more than 2,200 dealers are offering the re-built products for re-sale.

The president of the corporation is R. L. Mitchell and the vice-president is Leo Brill. This large business has been created in the last couple of years.

Bob English, one of the oldest salesmen in point of service that the Rubbercraft Corporation of California has on its payroll, was forced to stay home for a couple of weeks late in July and early August by an attack of flu.

Willard Voit of the W. J. Voit Rubber Corporation returned August 1 from British Columbia where he spent a two weeks vacation.

The Tire Clearing House has completed the re-building of its plant at 8228 S. Central Avenue, the building having been gutted by fire some months ago. The plant turns out camelback for retreading tires sold through the company's own retail outlet in down-town Los Angeles. The new building is of sheet metal construction. Leonard Maxwell is foreman.

Five men from Goodyear's plant at Norrkoping, Sweden, passed through Los Angeles recently on their way to Akron. The men were P. L. Young, I. S. Charky, Robert D. Wilson, E. O. Malmquist, and William Fallo. One woman, Mrs. I. S. Charky, was also in the party. The trip was long and inconvenient as well as somewhat hazardous, the men said. They went from Norrkoping to Moscow, from Moscow to Vladivostok by the Trans-Siberian railway, then to Manila, then to Los Angeles. Due to curtailment of production in the Sweden plant the men were transferred back to the United States.

The Golden State Rubber Mills, Inc., report increasing demand for its "occluder", a rubber device that fits over the human eye excluding light and yet allows the wearer also to wear his glasses. Orders from points as distant as South Africa and the Argentine are reported for last month. This company has also recently issued an attractive circular with illustrations of all items made of rubber for the stationery trade.

A new warehouse at the Goodrich plant, of re-inforced brick construction, is scheduled for completion about Sept. 15. The street in front of it is being paved to tie up with the new entrance street branching in from Union Pacific Avenue. The old entrance to the factory on Goodrich Avenue has been closed.

Ed Royal of H. M. Royal, Inc., reports a very interesting vacation-combined-with-business in the Pacific Northwest. He visited all major coast cities as well as Spokane. He did his quota of deep sea fishing off Orcas Island in Puget Sound. He was accompanied by his wife and daughter.

Paul J. Shoaff, resident director of the Goodyear rubber plantations in Sumatra, spent a few days in Los Angeles this month en route to Akron where he is spending several weeks. Another visitor at the plant in Los Angeles recently was P. W. Litchfield, former president of the company and now chairman of the board of directors.

Special heat-resisting rubber compounds, which lessen the hazard of heat in aircraft landings, are now being used in the manufacture of all airplane tubes by the B. F. Goodrich Co. These compounds, it is claimed, solve the problem of brake heat which arose with the trend toward larger airplanes landing at higher speeds with heavier loads.

REPLACEMENT TIRE SALES SET RECORD IN QUARTER

Replacement sales of automobile casings to consumers during the second quarter of 1941 numbered 13,078,000, a high record for recent years and 20 per cent above the 10,900,000 for the second quarter of 1940, when business was also above normal, according to the Department of Commerce. During the first quarter of 1941 the replacement sales of 6,125,000 casings were 129,000 lower than in the first quarter of 1940, hence a similar small part of the second quarter buying may represent delayed demand.

The main cause of the increase, however, was an endeavor of a part of the consumers to protect themselves against any possible future shortage of tires, and represented advanced purchases. Such purchases were made for inventory purposes by some operators of fleets of trucks, busses, and taxicabs, and also by some individual private motorists desirous of replacing partly worn by new tires, it was stated.

The total increase over the 1940 second quarter sales was 2,178,000 casings and probably 2,000,000 of those were advance buying. The 30,000,000 cars and trucks in operation have more than 120,000,000 tires in use, allowing for 6-wheel and 8-wheel vehicles, hence all the advance buying would be sufficient to equip less than 2 per cent of the vehicles. This indicates that the practice was not very widespread.

After all, the average consumer seldom buys a tire until it is needed. The partly worn tires removed from vehicles would in many cases be resold as used tires, or retreaded and eventually reused. The net effect is that average tire equipment on vehicles in operation has been improved, or that stocks held by fleet operators have been increased, to an extent that might reduce consumer demand in the last half of 1941 by nearly the equivalent of the second quarter advance purchases, the report said.

Bar White Sidewall Tires

In a move designed to conserve rubber, the Office of Production Management issued an order on August 9 prohibiting the manufacture of white sidewall tires. E. R. Stettinius, Jr., director of priorities, said that the action would save more than 6,000 tons of crude rubber a year. It takes approximately 2 pounds more crude rubber to make a white sidewall than an ordinary black tire. The prohibition will also save some zinc oxide. The order is effective August 24. The discontinuance of white sidewall tire manufacture was forecast by P. W. Litchfield, chairman of the Goodyear Tire & Rubber Co., more than two months ago, while the U. S. Rubber Co. announced on July 28 that it was voluntarily discontinuing production of such tires to lend the government full support in its rubber conservation program.

FOOTWEAR LINES SIMPLIFIED IN NEW CONSERVATION EFFORT

The Rubber Manufacturers Association has announced that its Rubber Footwear Division has adopted a program for the simplification of waterproof footwear lines which it believes will be an important contribution in the conservation of crude rubber. The purpose is to provide the necessary crude rubber for defense needs and at the same time provide the maximum of waterproof footwear covering for civilian requirements.

Among the changes adopted are discontinuance of colored goods, such as red, white and miscellaneous colors, confining production to such colors as black, various brown shades and olive drab. Also, changes in construction of rubber footwear will be made according to their value in contributing toward conservation.

To supplement these methods in the simplification of lines, the rubber footwear manufacturers will also make individual studies of more effective compounding methods, the elimination of unnecessary parts, the introduction of clothtop styles as a replacement of all-rubber items and the discontinuance of individual styles of small or diminishing volume.

The waterproof footwear manufacturers holding membership in the Rubber Manufacturers Association produce almost the entire output of these products.

Cellular Rubber Introduced

Cellular rubber, a new material of high insulation value that is twice as light as cork, has been introduced by the U. S. Rubber Co. The material consists of a thin external dense layer enclosing microscopic cells of nitrogen gas in a matrix of rubber. Each cell in the structure is distinct from its neighbor. The insulation or "K" value of cellular rubber, which will be marketed under the trade name of U. S. Royal Insulation Board, is expressed as .237. This figure compares with .30 for regranulated cork, .34 for gypsum in powdered form, .39 for laminated fibre board, and .59 for cellular gypsum dry. Two weights of insulation board are to be manufactured, only the lighter of which is to be fire resistant. The boards can be cut to shape with a bandsaw or powersaw, while surfacing can be accomplished with a planer.

Deadline Near for Group Papers

The deadline is nearing for the 1941 Prize Essay Contest of the New York Group, Rubber Division, A.C.S. All papers to be submitted in this year's contest must be in the hands of the Contest Committee on or before September 4, 1941. Entries should be sent to K. J. Soule, c/o Manhattan Rubber Mfg. Division, Raybestos-Manhattan, Inc., Passaic, N. J. Rules governing the contest may be secured from Mr. Soule on request.

Mansfield Tire & Rubber Co.

First Half: Net profit of $49,088 before Federal taxes. For the three months ended June 30, 1941, the company reports a net profit of $67,361, also before provision for Federal taxes.

OBITUARIES

William T. Baird

William Torrey Baird, founder and until his retirement several years ago president of the Baird Rubber and Trading Co., of New York City, died at his summer home in Sunapee, N. H., at the age of 80, on July 29.

Born in Toledo, Ohio, Mr. Baird was the son of Rev. James H. Baird and the great-grandson of Brevert Captain William Torrey of Massachusetts, founder of the Society of Cincinnati. With his brother, Robert Baird, he founded the Baird Rubber and Trading Co. in 1901. His son, William T. Baird, Jr., is now president of the concern, succeeding his father on his retirement.

Mr. Baird was a former president of the Orange, N. J., Memorial Hospital and a member of several civic associations in the Oranges. He was also a member of the vestry of the Grace Episcopal Church. He leaves a widow, two sons and a daughter.

John Carl Haartz

John Carl Haartz, president of the Haartz-Mason-Grower Co., Watertown, Mass., died of a heart attack suffered at his Campton, N. H., home on August 1. Mr. Haartz, who was also president of the Haartz Auto Fabric Co., was 60 years of age.

Mr. Haartz, an expert in textiles, organized his own firm, J. C. Haartz, Inc., manufacturers of rubberized fabrics for the automobile trade, many years ago, and established a mill in New Haven, Conn. In 1924 he resigned as president of this firm and organized the two companies of which he was president at his death. He leaves a widow, two daughters and a son.

John F. Lincks

John F. Lincks, manager of the cost department of the Firestone Tire & Rubber Co., and associated with that company for thirty-three years, died at his home, 181 Crescent Drive, Akron, on August 2, after an illness of seven weeks. He was one of five family members who worked for Firestone for a total of more than 100 years. He was a member of the board of directors of the 20-Year Service Club and a member of the 25-Year Service Club. Funeral services were held on August 4 with interment in East Akron Cemetery. He leaves a widow, two daughters and a son.

SENATE GROUP INVESTIGATES PROBLEMS OF TIRE DEALERS

According to a survey conducted by mail by a special committee appointed by the Senate to "study the problems of American small business," preferential treatment accorded manufacturer-owned retail stores is the major obstacle confronting the small business man in the tire industry.

Other obstacles, listed in the order of their importance by independent tire dealers, were: Sales made direct at or below most favorable dealer buying price by certain manufacturers to large and small trucking operators and to so-called national accounts; sales made direct at or below most favorable dealer cost to cities, counties, States and to the Federal Government, and the abuse of this privilege by government employees.

Dealers also complained about the offering of tires on a mileage-rental basis to bus and taxicab operators; higher labor costs which result from the Wage-Hour Law and organized labor activities; misleading and deceiving advertising, and lack of standards by which various makes and grades of tires may be judged.

The survey was conducted in cooperation with George J. Burger, 250 W. 57 St., New York, consultant to the independent tire trade, who extended the use of his office facilities.

General Cable Corporation

First Half: Net profit of $2,055,223, which compares with $1,495,581 last year. Net income for the quarter ended June 30, 1941, amounted to $1,049,217, which compares with $768,156 in the corresponding quarter of the previous year.

Anaconda Wire & Cable Co.

First Half: Net income of $1,410,519, equal to $3.34 each on 421,981 capital shares, which compares with $497,259, or $1.18 a capital share, reported for the first six months of 1940.

George H. Links, importer and dealer of waxes, varnish and lacquer gums, and other materials, has moved from 123 Front Street, where he has been located for the past 15 years, to 155 John Street in New York City. Expansion of the business is planned.

United Carbon Co., Charleston, West Virginia, is planning a fourth expansion of facilities at its carbon black manufacturing plant in Aransas Pass, Texas. The latest expansion will cost approximately $275,000.

The May, 1941, issue of the *Buick Magazine*, published by the General Motors Sales Corporation, Detroit, Michigan, carried an interesting article on the cultivation and use of guayule, written by S. R. Winters.

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By HARRY L. FISHER

Director of Organic Research, U. S. Industrial Chemicals, Inc., and Air Reduction Co. Formerly Research Chemist, The B. F. Goodrich Co. and U. S. Rubber Co.

A book that grew out of the experiences of the author during his seventeen years as a research chemist in lecturing on the chemistry and technology of rubber.

He discusses what rubber is, where it comes from, how it is obtained and how it is manufactured into finished products.

"RUBBER AND ITS USE" should prove most interesting and useful to students, laymen, and workers in other fields who want a practical, understandable, and authoritative book on rubber . . . a book which can be read with profit by newcomers in the rubber industry as well as by those with years of experience who want to brush up on the latest rubber developments.

CONTENTS

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Early History—The Beginnings of Manufacture of Rubber Goods—Charles Goodyear and Vulcanization—Growth of an Industry

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The Plantations and Some Statistics—Sources of Crude Rubber—Latex—The Latex System of the Tree-Tapping—Preparation of Crude Rubber

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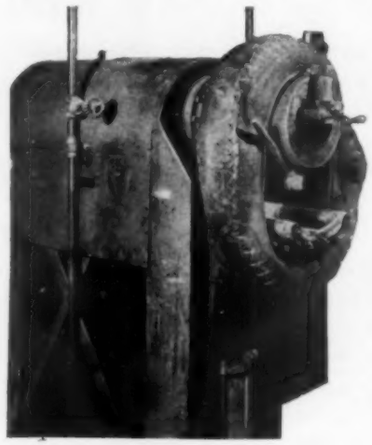
NEW EQUIPMENT

Black Rock Tire Debeading Equipment

New equipment for debeading scrap tires, consisting of a cutter for slitting and a puller for extracting the bead, has just been announced by the Black Rock Manufacturing Co., 179 Osborne St., Bridgeport, Conn. The two machines, both covered by U. S. Patent 2,230,302, issued to C. W. Leguillon, were developed by the B. F. Goodrich Company and have been in actual use in that company's reclaiming plant in Akron for the past year, during which their performance has proved that they produce 10% more scrap from a tire than present debeading methods. Based on 1940 figures for tire scrap, this indicates a gain of approximately 34,000,000 pounds of rubber scrap with a valuation of more than $250,000 a year.



Cutting Machine

Bead Puller

From the standpoint of national defense, the machines are of especial importance at this time as a means of increasing the available supply of rubber. In addition to the saving of scrap, the machines are also said to effect savings in time and labor.

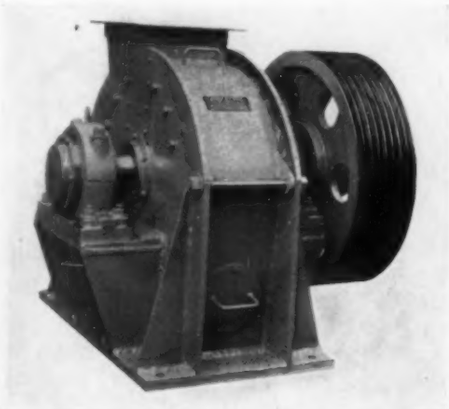
The cutter, or slitter, simultaneously and automatically cuts through the rubber and fabric of the bead. The cut reaches to, but not through, the wire. The tire is then transferred to the puller device which extracts both beads at the same time. By these methods the entire bead section of the tire, with the exception of the wire and the hard rubber coating which adheres to the wire, is available for reclaiming. The two machines used in the method are shown in the accompanying illustrations.

The cutter is equipped with two rotating corrugated members in the cutting head, operated by a 3 h.p. motor, as well as with two tungsten steel knives and a tensioning device, both operated by pneumatic cylinders. The puller consists of a flat bed which is large enough to accommodate two tires and clamping devices which are operated pneumatically. Two knife-pointed cutting hooks are poised overhead. These cutting hooks are operated by a reversing motor on the chain hoist principle, so that when one hook is up the other is down.

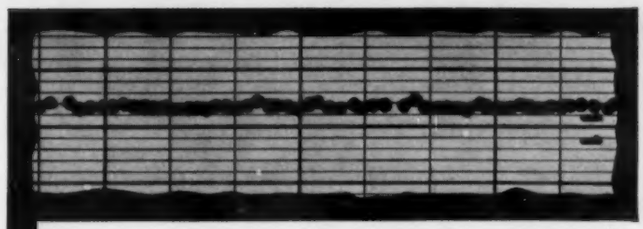
Operation of the equipment is briefly as follows: The tire is placed over the cutting head of the cutter and the tensioning device is brought into contact with the tire. The two knives are brought into position against the beads at the same time. The tire is then rotated and the knives cut through the fabric and rubber to the wire, the tire being automatically released after one full revolution. Transferred to the puller device, the tire is clamped down to bring the two sidewalls together near the beads, one hook is lowered and after it is placed under the bead section it starts to move upward cutting through the rubber and fabric, withdrawing the beads from both sides of the tire at the same time.

Sprout-Waldron Super Knife Cutter

Sprout, Waldron & Co., Muncy, Penna., has introduced a new machine designed specifically for the preliminary reduction of scrap rubber, plastics and similar



materials. Called the Heavy Duty Type 1680 Super Knife Cutter, the machine is equipped with a heavy steel rotor, 10 inches wide. Side plates are fabricated



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from ¾-inch steel plate, the base from 1-inch plate. The steel shaft is 4.875 inches in diameter. Efficient seals are built into the sides of the cutter, preventing the material being cut from reaching the bearings and eliminating contamination of the material by grease. As may be seen in the accompanying illustration, the entire top section of the machine is hinged and can be readily opened, allowing easy access to the inside of the machine for the purpose of changing screens and adjusting knives. Convenient hand holes with covers are provided in the base to permit adjustment of the bottom bed knife.

The new machine has five ¾-inch thick fly knives mounted on the rotor and three 1-inch thick stationary knives, one in the bottom and one in each cheek. Following each stationary knife is a section of ⅜-inch thick steel plate perforated screen. These screens are so located that they permit the immediate escape of material reduced to the proper size, thus reducing the load of oversize material with a resultant saving on h.p. and an increase in capacity.

In a recent installation of one of these new machines, when operating on running board scrap and strips of vulcanized rubber ranging from 3 to 8 inches length in size, a capacity of from 800 to 1,000 pounds per hour was obtained when cutting through a $\frac{7}{16}$-inch screen. For this capacity an average of 25 h.p. was required.

Slow Speed Air Powered Mixer

The addition of another new model to its line of mixing equipment is announced by the Eastern Engineering Co., 45 Fox St., New Haven, Conn. Known as the Eastern A-2 Air Powered Mixer, the new model is explosion proof and can be operated without danger in the presence of serious fire hazards. It has a special high torque slow speed air motor, which makes it suitable for heavy mixing and slow powerful fluid handling. It is variable speed and can thus be used in applications where otherwise two or more mixers of various sizes would be required. The air motor is rated at 1½ h.p. with a maximum speed of 400 r.p.m. on 40 pounds pressure. The speed can be varied by reducing the air pressure. The motor is equipped with an exhaust silencer. The agitator assembly can be furnished with dual propellers or with monel metal or stainless steel construction if desired. The new mixer can be used only where compressed air is available.

New Industrial Multi-Breaker

A new 230-volt industrial multi-breaker, at little more than the cost of a type A switch, has been introduced by Cutler-Hammer, Inc., Milwaukee, Wisconsin. The new breaker affords economical application as a motor circuit switch or service disconnect switch. It is fuseless, with bi-metallic strip actuation, visible trip indication, and trip free lever. It is quick make and quick break, with a rated capacity of 230 volts from 15 to 100 amperes, available in 3 pole, 3 pole solid neutral or 4 pole solid neutral types. Calibration is set at the factory and cannot be tampered with. The breaker is completely enclosed and semi-dust-tight. Front access and operation are said to make this breaker convenient, compact and economical of space.

Traveling Batch Scale Car

A traveling batch scale car, particularly suited for the handling of batch materials entering into the manufacture of rubber and clay products, has been developed by the Cleveland Tramrail Division of the Cleveland Crane & Engineering Co., Wickliffe, Ohio. It can also

be adapted to the handling of chemicals and batch materials used in a variety of industries. The car is motor-driven and controlled by an operator who rides on the platform space provided to the left of the bucket. A variable speed drum controller permits the car to be traveled at any speed up to 300 feet per minute. Double overhead rails make it possible to straddle overhead bins so that their chutes may be brought close to the car bucket. The unit makes it possible to gather the exact amounts from various bins that go to make up a batch. The scale on the car accurately weighs the ingredients as they are dumped in. The bucket is easily emptied by tilting through the use of a crank wheel. The unit illustrated will handle batch loads of one-half ton. Other Cleveland Tramrail traveling batch scale cars can be provided to meet individual requirements.

Alternating Current Tachometer

For use in measuring revolutions per minute, feet per hour, or gallons per minute in a manufacturing plant where rotating equipment is used, a new alternating current tachometer has been announced by the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penna.

Known as Type A-80, the tachometer consists of an alternating current generator and a voltmeter of the rectifier type. No brushes or commutator are used in the generator which is of the permanent magnet, a-c inductor type.

The rotating element consists of laminated iron keyed to a rust resisting steel shaft. Laminations are slotted to permit variation of the air gap reluctance when the shaft is rotated. This in turn varies the flux linking the voltage coils and induces an alternating voltage in the coils. The alternating voltage is rectified by a Rectox unit in the voltmeter calibrated in r.p.m., feet per hour, or other units depending on the application.

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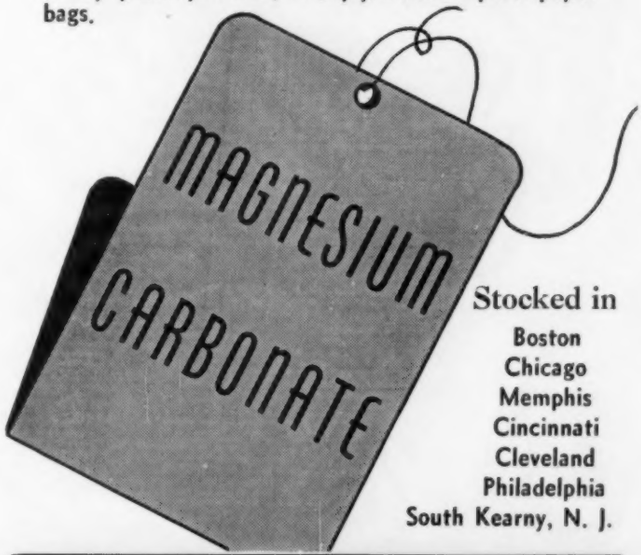

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For 1938-1939, Cloth, $4.00

LATEX IN INDUSTRY
By Royce J. Noble, Ph.D.
Text Book on Latex. Price: $7.00

LATEX AND ITS INDUSTRIAL APPLICATIONS (Vol. I)
By Frederick Marchionna
Bibliography of latex patents and literature to June, 1932. Price: $15.00

LATEX AND RUBBER DERIVATIVES AND THEIR INDUSTRIAL APPLICATIONS (Vols. II & III)
By Frederick Marchionna
Bibliography of latex patents and literature from June, 1932 to January, 1937; rubber derivatives to January, 1937. Price: $20.00
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NEW EQUIPMENT (CONT'D)

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The **Portereducer Agitator Drive,** utilizing the planetary system of gearing, has been developed by the Process Equipment Division, H. K. Porter Co.

Inc., Pittsburgh, Penna. Due to the planetary system of gearing, operation is smoother, greater reduction can be accomplished in a given space, and tooth load is at a minimum for any given torsional effort, according to the manufacturer.

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The trigger control valve recently developed by Walter Kidde & Co., Inc., Bloomfield, N. J., for its 2-pound **carbon dioxide extinguisher** is now being used as standard equipment on its new-type 4-pounder. This feature not only permits the extinguisher to go into action faster but also insures no wasting of the carbon dioxide gas while the operator is maneuvering around the blaze.

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Yoo-hoo, Captain. For greater resistance to aging, use HYCAR.

See page 357

REVIEWS

BOOKS

Handbook of Chemistry (4th Edition). Compiled and edited by Norbert Adolph Lange. Published by Handbook Publishers, Inc., Sandusky, Ohio. 5¼ x 7¾ in. 1935 pp. $6.00.

According to the preface, this latest edition of the *Handbook of Chemistry* retains all of the subject matter in the previous edition, with the exception of the table "Wave Length of the Principle Lines in the Emission Spectra of the Elements," which has been replaced with two new tables, "Qualitative Spectrographic Analysis" and "Sensitive Lines of the Elements." Changes in all standing matter throughout the work have of course been made in order to keep the information accurate and up-to-date.

In addition, a number of new tables make their appearance in this Fourth Edition. Of especial interest to the rubber industry, is the inclusion for the first time of a section devoted to synthetic rubber, containing tables on electrical and physical properties, giving the chemical structures, and listing the varieties of synthetic rubbers available. Some data on the swelling of vulcanized synthetic rubbers in liquids is also included. All of the data in this section is taken from the booklet on synthetic rubber prepared by Lawrence A. Wood for the National Bureau of Standards in 1940.

The section of mathematical data and tables, which runs to 269 pages, and which is one of the most valuable in the book, has been retained. An unusually complete index, with more than 3,000 entries, covering 35 pages, two columns to the page, facilitates finding any information desired. The size and style of type used in the book make for ease and consequent accuracy of reading.

•

Emulsions and Foams. By Sophia Berkman and Gustav Egloff. Published by Reinhold Publishing Corp., 330 West 42nd St., New York City. 6 x 9 in. 591 pp. $8.50.

This book is an exhaustive treatise on the theory of emulsions and foams and the practical knowledge of emulsions. Stressing the point that emulsions and foams may be either desirable or undesirable, depending on the application, the authors, both associated with the Universal Oil Products Company of Chicago, devote considerable space to methods of overcoming difficulties in oil foaming and emulsification. Methods of laboratory analyses are carefully outlined. Asphalt, bitumen and lubricating-oil emulsions are discussed at length, with specific examples of the broad application of hydrocarbon emulsions.

Brief references to latex, rubber and synthetic rubber emulsions, and to the admixing of the solutions of these materials with asphalt, tar, bitumen and other emulsions, appear throughout the text. The work of Henri, Reiner, Barus and others is mentioned. The book is divided into five chapters, the first devoted to theory; the second, third and fourth to practical knowledge; and the fifth to laboratory methods used in the examination of emulsions. A complete bibliography appears at the end of each chapter. Author and subject indexes are included.

•

Plastics Mold Designing. By Gordon B. Thayer. Published by American Industrial Publishers, Fairmount-Cedar Building, Cleveland, Ohio. 6 x 9 in. 64 pp. $2.50.

Not only are the fundamentals of plastics mold design discussed in this book, which is based on material published serially in the *Tool & Die Engineer*, but they are applied to representative types of compression and injection molds. The

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important compression mold types are classified and described. Some space is devoted to fixtures, which are an important auxiliary in plastics molding. Mold sinking methods are described and product design is discussed in relation to mold building methods. Mold terms are defined in a special section on nomenclature. Pen and ink drawings, all by the author, are liberally used.

The above will give the reader an idea as to the contents of this little book, but it could not convey the value that this "mold handbook" gives to both the mold manufacturer and the plastics molder. Like rubber, most plastics are variable and molds must be carefully designed, with all variable factors considered, before construction. Would that such a "handbook" on rubber molds was available!

•

Aerosphere—1941. Edited by Glenn D. Angle. Published by Aircraft Publications, 370 Lexington Ave., New York City. 8½ x 11½ in. 948 pp. $10.00 (plus shipping charges).

The second edition of this world-wide aviation annual has been revised and brought completely up-to-date. Some changes in arrangement have been made as the result of criticism and suggestions, the most important of which is in the reduction in the number of pages as a result of omitting the section on the "World's Aircraft Engines," which hereafter will be made available in a separate companion volume. Several new features are included.

This latest edition is divided into four sections, as follows: (1) Modern Aircraft; (2) Modern Aircraft Engines; (3) Statistics; (4) Buyer's Guide. Interesting features include international aircraft markings in full color; development of aviation by the U. S. Army, Navy and Coast Guard throughout the years; current types of U. S. Army and Navy planes and their usage in war time. All information given is carefully indexed and cross-indexed. The answers to most of the questions about the entire world's aircraft and engines and related activities will be found in this directory.

BOOKLETS, CATALOGS, Etc.

Softener Study for Hycar O.R. Hydrocarbon Chemical & Rubber Co., Akron, Ohio. 8½ x 11 in. 20 pp.

This study of softeners for Hycar O.R., an oil-resistant type of synthetic rubber, is divided into four sections: Introduction; Classification of Softeners; Properties of Specific Softeners; General Properties of Softeners. The classification section is broken down into softeners for high tensile strength, high elongation, high and low Durometer stocks, resilience, etc. The properties section gives data on such softeners as Bardol B, Cardolite, P-25, Cumar, dibutyl phthalate, Nevoll, etc. The general properties section gives such data on softeners as physical state at room temperature, milling behavior, tack, modulus at 300%, resilience, compression set, etc. The study should prove of interest to every manufacturer using synthetic rubbers.

•

Industrial Health Practices. National Association of Manufacturers, 14 West 49th St., New York City. 6 x 8½ in. 76 pp. 50c.

About four years ago the N.A.M. organized a committee to study the problems involved in maintaining the maximum degree of health among workers and to assist in all ways possible to bring the solutions of these problems into more widespread being. The survey, of which this pamphlet is the report, is the most representative one on the subject ever completed. It contains replies from over 2,000 plants through 47 states, employing approximately 2,000,000 workers. Much valuable information regarding the value, use, age and cost of industrial health programs, as well as industrial physical examination practices, is included. Several charts are utilized.

Rubber and Its Engineering Uses. By B. D. Porritt. Published by the British Rubber Publicity Association, 19 Fenchurch St., London, E.C.3, England. 5½ x 8½ in. 16 pp.

Reprinted from the December 20, 1935, issue of *The Engineer,* this booklet, as indicated by its title, is a discussion of the engineering uses of rubber. Written for the lay engineer, it first describes the origin of rubber and then takes the reader through the various steps leading up to vulcanization. The balance of the book is devoted to specific applications of rubber from the engineering standpoint.

Additional Equipment Briefs . . . .

A new universal non-flutter, positive snap-action, **hydraulic pressure switch,** so designed that it can be used throughout the entire range of two separate capacities with only a nominal change, and so constructed as to be explosion, dirt, oil and moisture proof, has been announced by the Progressive Welder Co., East Outer Drive, Detroit, Mich.

•

A new type **hardness tester** for use on hard rubber, plastics, aluminum, etc., has been developed by the Barber-Colman Co., Rockford, Ill. Termed the Impressor, its dial scale is graduated from 0 to 100 and the reading is applied to a conversion table to determine the corresponding Rockwell number.

•

Eastern Engineering Co., New Haven, Conn., has announced the addition of a newly-designed air power unit, designated as **Eastern A-1 Air Mixer,** to its line. It was designed as a portable batch mixer with suitable characteristics for the average job in 50 or 100 gallon containers.

•

A new line of **"Torflex" bearings** with inner walls of a new thinner material of either plain or graphited bronze on steel, said to have increased resistance to pounding and shock and a comparatively low coefficient of friction, is announced by the Harris Products Co., 5408 Commonwealth Ave., Detroit, Mich.

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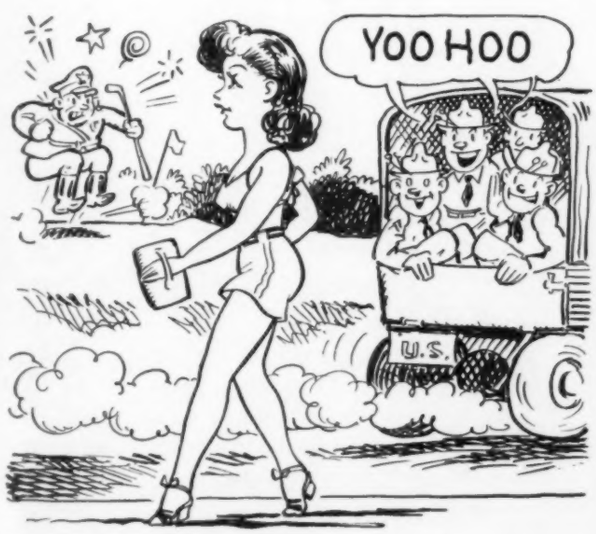

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See page 357

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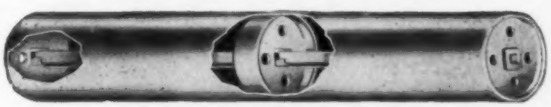

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, AUGUST 12, 1941

Crude Rubber

FROM 21.75 quoted on the Commodity Exchange on July 10th, the price of spot rubber moved up steadily until it reached 23.00 on July 24, the figures being the low and high, respectively, for the period. A fair amount of "free" rubber was sold to the Rubber Reserve Company during this 14-day period, while uncertainties in the Far East developing out of the resignation of the Japanese Cabinet contributed to the rise. Since July 24 the price has hovered around the 23-cent level, dropping off a few points one day, but coming promptly back to 23 cents on the following day, witth the exception of the last three trading days during which the price has dropped to and stayed at 22.75. Both buyers and sellers are now waiting on the sidelines for the government to advise when the new selling price of 22½ cents per pound for rubber by the Rubber Reserve Company will become effective and what the minimum dealer and importer service charges to factories will be. Due to the fact that the reserve company is now the sole importer of rubber from the Far East, with purchases made at stipulated prices, we are discontinuing Singapore quotations. Quotations in the outside market and on the Exchange, follow:

As of August 12

Plantations—

Ribbed Smoked Sheets—

No. 1 Spot	—	@	.22⅝
August	—	@	.23⅛
September	—	@	.23⅛
No. 2	—	@	.22⅜
No. 3	—	@	.22⅛
No. 4	—	@	.22
Thin Latex Crepe	—	@	.24
Thick Latex Crepe	—	@	.24
Brown Crepe, No. 1	—	@	.21¼
Brown Crepe, No. 2	—	@	.20⅞
Amber Crepe, No. 2	—	@	.21¼
Amber Crepe, No. 3	—	@	.20⅞
Brown Crepe, Rolled	—	@	.18½

Latex—

Normal, per lb., carload lots	—	@	.27½

Paras—

Up-River, fine	—	@	.28
Acre Bolivian, fine	—	@	.28

Balata—

Brazilian block	—	@	.13

LONDON MARKET

(London Cable Temporarily Discontinued)

Scrap Rubber

Demand for all grades of scrap continues and dealers report business on the same high level as in recent months. The stock situation is normal, although some small dealers are holding back for better prices. Prices on some grades of scrap, including boots and shoes and auto tire peelings, have increased slightly since our last report. Current quotations follow:

(Prices to Consumers

Auto tire peelings, ton	31.00	@	32.00
Mixed auto, ton	16.50	@	17.00
Beadless tires, ton	22.00	@	23.00
Clean solid truck tires, ton	37.50	@	40.00
Boots and shoes, ton	28.00	@	30.00
Arctics, untrimmed, ton	24.00	@	26.00
Inner tubes, No. 1, lb.	.11	@	.12
Inner tubes, No. 2, lb.	.06½	@	.06¾
Inner tubes, Red, lb.	.07½	@	.07⅝

Reclaimed Rubber

Demand continues unabated for reclaim, with interest expressed by practically every branch of the rubber manufacturing industry. Reclaimers are not so much concerned with orders as they are with capacity problems. Prices have been increased slightly on tube stocks since our last report. Current quotations follow:

Shoe

Unwashed, lb.	.07	@	.07¼

Tube

No. 2 (Compounded), lb.	.10½	@	.12½
Red Tube, lb.	.12	@	.12½

Tires

Black (acid process), lb.	.07½	@	.07¾
Black, selected tires, lb.	.06½	@	.06¾
White, lb.	.13½	@	.14½
Truck, Heavy Gravity, lb.	.08½	@	.08¾

Miscellaneous

Mechanical blends, lb.	.04½	@	.05½

Tire Fabrics

(Prices Net at the Mill)

Peeler, carded, 23/5/3, lb.	.38	@	.38¼
Peeler, carded, 23/4/3, lb.	.39	@	.39¼
Peeler, carded, 15/3/3, lb.	.36	@	.36¼
Peeler, carded, 15/4/2, lb.	.36	@	.36¼
Peelcr, carded, 13/3/3, lb.	.35	@	.35¼

CHAFERS

Carded, American, 1 1/16", lb.	.38½	@	.39
Carded, American, 1", lb.	.29	@	.39

Cotton

Starting from a quotation of 15.94 on July 10, low for the period, the price of middling uplands started moving upwards, reaching 16.58 on July 15. Recurring reports of "weevil" weather in the south were primarily responsible for the movement. Lack of trade support brought the price down to 16.32 within a few days but again the market showed a tendency for higher prices, the quotation going up to 17.41 on July 22. After dropping to 17.01 the following trading day, the price skyrocketed to 17.91, high for the period, on July 26 following the action of the Senate Agriculture Committee in voting a rider to the House-approved wheat quota bill to "freeze" all Government holdings of cotton for the duration of the emergency. The market has followed an erratic course since July 26. In the past few days the price has been dropping steadily. Traders have placed a bearish interpretation on the government's latest crop report and are accordingly liquidating. Quotations for middling uplands on the Exchange follow:

	July 9 Close	August 12 High	August 12 Low	August 12 Close
October	15.37	16.06	15.65	15.70
December	15.47	16.25	15.84	15.88
March	....	16.35	15.95	16.03

Sheetings

48x40	36 in.	5.50	lb.	—	@ 6.909
40x40	36 in.	6.15	lb.	—	@ 6.179
40x36	36 in.	6.50	lb.	—	@ 5.846
48x48	40 in.	2.50	lb.	—	@14.20
48x48	40 in.	2.85	lb.	—	@12.460
56x60	40 in.	3.60	lb.	—	@10.555
48x44	40 in.	3.75	lb.	—	@ 9.733

Ducks

Enameling (single filling), lb.	.40	@	.43
Belting and Hose, lb.	.35	@	—
Single filling, A grade, lb.	.16¼	@	.17½
Double filling, lb.	.17½	@	.18½

Closing Rubber Prices on New York Commodity Exchange, Inc.

"New" Standard Contract of 10 Tons

FROM JULY 10 TO AUGUST 12

Date		Spot	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Sales
July	10	21.75	21.15	——	21.35	21.25	——	21.25	21.05	——	21.00	——	——	——	——	14
	11	21.87	21.15	——	21.35	21.30	——	21.30	21.05	——	21.00	——	——	——	——	3
	12	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	13	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	14	22.00	21.25	——	21.51	21.45	——	21.35	21.10	——	21.20	——	——	——	——	15
	15	22.00	21.35	——	21.70	21.65	——	21.50	21.25	——	21.40	——	——	——	——	20
	16	22.35	21.40	——	22.02	21.97	——	21.80	21.45	——	21.60	——	——	——	——	10
	17	22.35	21.40	——	22.00	21.97	——	21.90	21.45	——	21.60	——	——	——	——	22
	18	22.35	21.30	——	22.00	21.97	——	21.95	21.45	——	21.60	——	——	——	——	15
	19	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	20	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	21	22.50	21.30	——	22.25	22.05	——	22.00	21.45	——	21.60	——	——	——	——	6
	22	22.50	21.30	——	22.30	22.20	——	22.15	21.45	——	21.60	——	——	——	——	23
	23	22.75	21.60	——	22.60	22.50	——	22.35	21.40	——	21.60	——	——	——	——	39
	24	23.00	22.10	——	22.75	22.65	——	22.45	21.60	——	21.80	——	——	——	——	20
	25	23.00	22.10	——	23.00	22.90	——	22.45	21.61	——	21.80	——	——	——	——	60
	26	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	27	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	28	22.75	22.10	——	22.75	22.65	——	22.35	21.25	——	21.30	——	——	——	——	11
	29	23.00	——	——	22.61	22.35	——	22.05	20.95	——	20.90	——	——	——	——	2
	30	23.00	——	——	22.50	22.30	——	22.00	22.50	——	20.40	——	——	——	——	12
	31	22.90	——	——	22.60	22.30	——	22.05	20.60	——	20.45	——	——	——	——	24
Aug.	1	23.00	——	——	22.40	22.25	——	22.00	20.60	——	20.40	——	——	——	——	17
	2	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	3	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	4	23.00	——	——	22.50	22.25	——	22.00	20.60	——	20.40	——	——	——	——	7
	5	23.00	——	——	22.50	22.35	——	22.20	20.40	——	20.30	——	——	——	——	23
	6	23.00	——	——	22.35	22.35	——	22.35	20.40	——	20.30	——	——	——	——	10
	7	23.00	——	——	22.50	22.50	——	22.50	20.40	——	20.30	——	——	——	——	20
	8	22.75	——	——	22.50	22.25	——	22.30	20.80	——	20.80	——	——	——	——	8
	9	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	10	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	11	22.75	——	——	22.50	22.50	——	22.50	20.80	——	20.80	——	——	——	——	31
	12	22.75	——	——	22.40	22.50	——	22.50	20.80	——	20.80	——	——	——	——	11

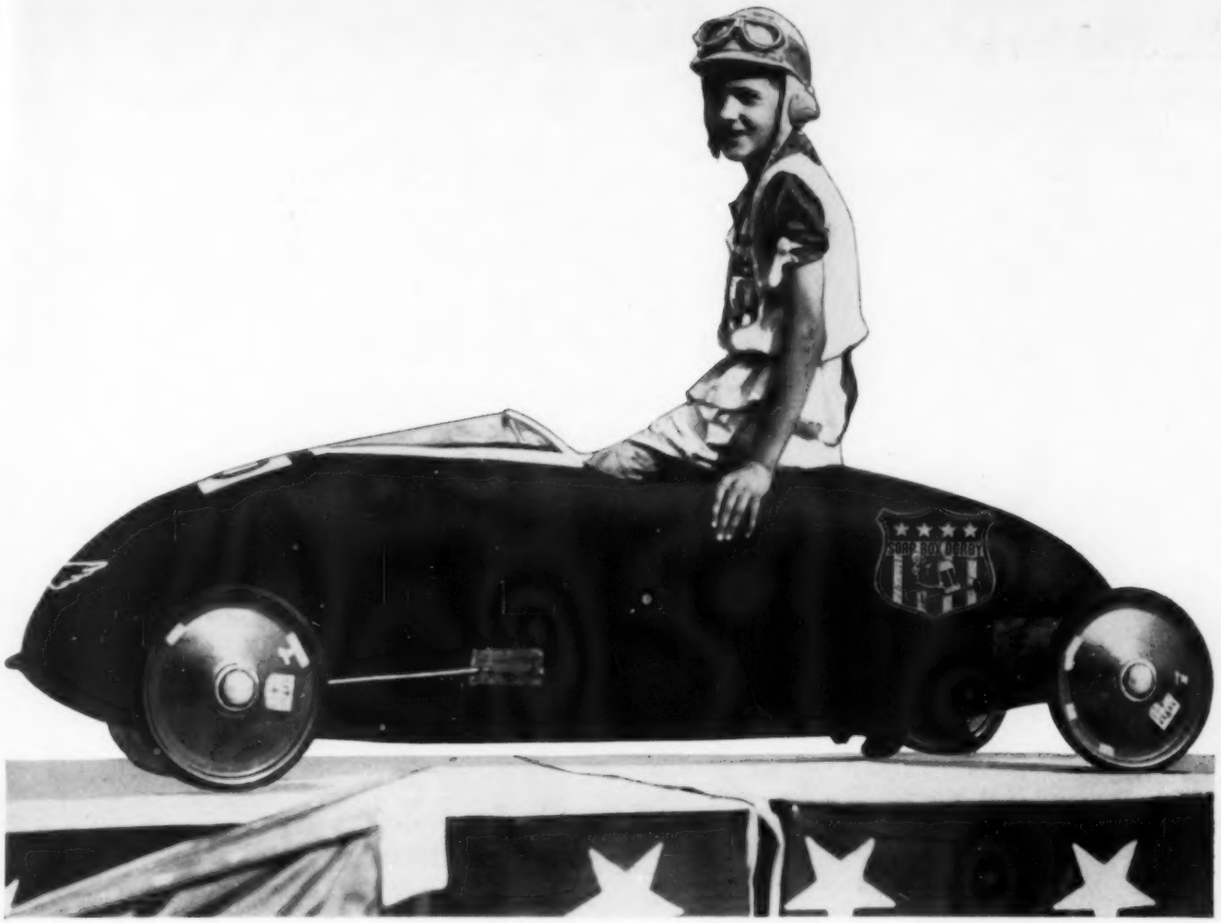

Photo taken at Derby Downs, Akron, Ohio

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CHEMICAL MARKETS

New York, Aug. 12, 1941
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ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.24 @	.30
A-10	lb.	.31 @	.35
A-11	lb.	.52 @	.65
A-19	lb.	.52 @	.65
A-32	lb.	.70 @	.80
A-77	lb.	.42 @	.55
A-100	lb.	.42 @	.55
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.	.55 @	.60
Beutene	lb.	.70 @	.75
Butyl Zimate	lb.	— @	2.15
Captax	lb.	.50 @	.55
Crylene	lb.	.40 @	.47
Di-Ortho-Tolyguanidine	lb.	.44 @	.46
Diphenylguanidine	lb.	.35 @	.45
El-Sixty	lb.	.50 @	.65
Ethyl Zimate	lb.	— @	2.15
Ethylidene aniline	lb.	.42 @	.43
Formaldehyde aniline	lb.	.31 @	—
Guantal	lb.	.40 @	.50
Hepteen	lb.	.35 @	.40
Hexamethylenetetramine	lb.	.33 @	—
Lead Oleate, No. 999	lb.	.13 @	—
Witco	lb.	.15 @	—
Monex	lb.	— @	1.75
Phenex	lb.	.50 @	.55
Pip-Pip	lb.	— @	2.15
Pipsolene	lb.	1.55 @	1.80
R & H 50-D	lb.	.42 @	.43
R-2	lb.	1.40 @	1.80
R-2 Crystals	lb.	2.50 @	2.75
R-23	lb.	.40 @	—
RN-2	lb.	1.40 @	1.80
RN-2 Crystals	lb.	2.00 @	2.25
Rotax	lb.	.60 @	.65
Safex	lb.	1.20 @	1.30
SPDX	lb.	.70 @	.75
Super-Sulphur No. 1	lb.	.50 @	—
No. 2	lb.	.18 @	.20
Thiocarbanilide, drums	lb.	.24 @	.30
Thiurad	lb.	— @	2.00
Trimene	lb.	.55 @	.65
base	lb.	1.05 @	1.20
Triphenylguanidine	lb.	.45 @	—
Tuads	lb.	— @	2.00
Ulto	lb.	1.25 @	1.75
Ureka	lb.	.60 @	.75
Blend B	lb.	.60 @	.75
Blend C	lb.	.56 @	.65
Vulcanex	lb.	.42 @	.43
Vulcanol	lb.	.85 @	—
Zimate	lb.	— @	2.00
Inorganic			
Litharge, domestic	lb.	.07 @	.07½
Magnesia, calcined, heavy	lb.	.04 @	—

COLORS

Blacks (See Next Column)			
Blues			
Prussian	lb.	.33 @	—
Ultramarine	lb.	.16 @	.27
Browns			
Mapico	lb.	.11 @	—
Umber, Turkey	lb.	.04¾ @	.05¼
Greens			
Chrome	lb.	.21 @	.30
Guignet's Green	lb.	.70 @	—
Reds			
Antimony crimson, 15/17	lb.	— @	—
sulfur, free	lb.	— @	—
Indian	lb.	.08¾ @	—
Domestic (Maroon)	lb.	.11 @	—
Mapico	lb.	.09¼ @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red	lb.	.09¼ @	—
Whites			
Cryptone No. 19	lb.	.05¼ @	.05½
Cryptone CB No. 21	lb.	.05¼ @	.05½
Cryptone ZS-86	lb.	.07¾ @	.08
Cryptone ZS-230	lb.	.07¾ @	.08
Cryptone ZS-800	lb.	.07¾ @	.08
Lithopone:			
Albalith	lb.	.0385@	.0410
Azolith	lb.	.0385@	.0410
Ray-bar	lb.	.05½ @	.05¾
Ray-cal	lb.	.05¼ @	.05¾
Rayox	lb.	.13½ @	.14¼
Titanox A	lb.	.13½ @	.13¾
Titanox B	lb.	.05½ @	.05¾
Titanox C	lb.	.05¼ @	.05½
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.06½ @	.06¾
Anaconda, lead free	lb.	.06½ @	.06¾
Horsehead Lead Free Brand:			
Special—3	lb.	.06½ @	.06¾
XX Red—4	lb.	.06½ @	.06¾
XX Red—72	lb.	.06½ @	.06¾
XX Red—78	lb.	.06½ @	.06¾
XX Red—103	lb.	.06½ @	.06¾
Kadox, black label—15	lb.	.06½ @	.06¾
Red label—17	lb.	.06½ @	.06¾
St. Joe, black label	lb.	.06½ @	.06¾
green label	lb.	.06½ @	.06¾
red label	lb.	.06½ @	.06¾
U. S. P.—7. bbls.	lb.	.09½ @	.09¾
Zinc Oxide—French Process:			
Florence White Seal—7 bbls.	lb.	.08½ @	.08¾
Green seal—8	lb.	.08 @	.08¼
Red seal—9	lb.	.07½ @	.07¾
Yellows			
Cadmolith	lb.	.50 @	.55
Chrome	lb.	.14½ @	—
Mapico	lb.	.06¾ @	—

BLACKS
(In bags, carload lots)

Aerfloted Arrow		.0335@	—
Certified		.0335@	—
Certified Spheron		.0335@	—
Continental		.0335@	—
Disperso		.0335@	—
Dixiedensed		.0335@	—
Dixiedensed 66		.0335@	—
Excello		.0335@	—
Furnex		.03 @	—
Furnex Beads		.03 @	—
Gastex		.03 @	—
Kosmobile		.0335@	—
Kosmobile 66		.0335@	—
Micronex (Amarillo)		.0335@	—
Micronex Beads (Amarillo)		.0335@	—
Pelletex		.03 @	—
P-33		.0475@	—
Shell Carbon (Delivered Midwest)		.024 @	—
Supreme		.0335@	—
Thermax		.02 @	—
Wyex		.0335@	—

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85	@24.50
Asbestine	ton	14.00	@18.00
Barium carbonate (98-100%)	ton	47.00	@49.00
Barytes	ton	22.85	@31.50
Bentonite	ton	11.00	@16.00
Blanc fixe, dry	ton	50.00	@62.50
Calcene	ton	37.50	@43.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	45.00	@60.00
heavy	ton	45.00	@55.00
Clay, Aerfloted, Suprex	ton	10.00	@22.00
Crown (f.o.b. plant)	ton	10.00	@ —
Dixie	ton	10.00	@22.50
Langford	ton	—	@ 7.50
McNamee	ton	10.00	@22.50
Par	ton	10.00	@22.50
Witco	ton	10.00	@ —
Cotton Flock (Dark)	lb.	.10½ @	.13
Kalite No. 1	ton	24.00	@50.00
Kalite No. 3	ton	34.00	@60.00
Kalvan	ton	95.00	@121.00
Magnesium carbonate	lb.	.06¼ @	.09¾
Mica	ton	35.00	@44.00
Mineralite	ton	—	@30.00
Pyrax A	ton	6.50	@20.00
Rottenstone (powd. Dom.)	ton	25.50	@37.50
Silene (calcium silicate)	lb.	.04 @	.045
Starch, powdered	cwt.	2.90	@ 4.10
Talc, domestic	ton	17.00	@25.00
Whiting, commercial	ton	16.00	@26.00
Columbia Filler	ton	9.00	@14.00
Witco	ton	6.00	@ —
Wood Flour (100 mesh)	ton	30.00	@32.00

MINERAL RUBBER

285°-300° Mineral Rubber	ton	22.00	@ —
Black Diamond	ton	25.00	@ —
Genasco, solid (factory)	ton	—	@ —
Hard Hydrocarbon	ton	22.00	@42.00
Parmr, solid	ton	—	@ —
Pioneer, M.R. solid	ton	—	@ —

MISCELLANEOUS

Aromatics—Rodo #0	lb.	3.50 @	4.00
Rodo #10	lb.	4.50 @	5.00
Curodex 19	lb.	2.75 @	—
Curodex 188	lb.	3.50 @	—
Curodex 198	lb.	4.50 @	—
Para-Dors	lb.	4.50 @	—
Aresklene No. 375 (dispersing, wetting and penetrating agent)	lb.	.35 @	.50
Darvan (dispersing agent)	lb.	.30 @	.39
Santomerse S (dispersing, wetting, penetrating and stabilizing agent)	lb.	.11 @	.25
Sponge Paste	lb.	— @	.18
Sunproof	lb.	.23 @	.28
Tackol (tackifier)	lb.	.085 @	.18
Tonox	lb.	.52 @	.61
Ty-Ply R (and S)	gal.	6.75 @	8.75
Unicel (blowing agent)	lb.	.50 @	—

SOFTENERS

Acids			
Acetic, 28%, bbls.	100 lb.	3.18 @	3.43
Nitric, 36 degrees	cwt.	5.00 @	5.95
Acids, Fatty			
Laurex	lb.	.13 @	.15½
SL #10	lb.	.12 @	.14
Stearex Beads	lb.	.10 @	.11
Stearic, double pressed	lb.	.12½ @	.13½
Stearite	lb.	.10 @	—
Alkalies			
Caustic Soda, 76%	cwt.	2.70 @	5.70
Soda Ash, 58%	cwt.	1.10 @	2.93
Oils			
Cycline Oil	gal.	.14 @	.20
Degras, bbls.	lb.	.08 @	.08½
Fluxrite	lb.	.05½ @	.06½
Para-Flux	gal.	.08½ @	.18
Para-Lube	lb.	.425 @	.48
Petrolatum, amber	lb.	.03¼ @	.04¼
Pigmentaroil, tank cars.	gal.	.16 @	—
in drums	gal.	.22½ @	.23½
Pine, steam distilled	gal.	.54 @	.59
Rosin Oil, cmpd.	gal.	.40 @	—
Rubberol	lb.	.13½ @	.14
Rubtack	lb.	.10 @	—
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	— @	—
Witco Softener No. 20.	gal.	.20 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.06 @	.06¼
coal tar	ton	19.00	@22.00
hardwood	ton	16.00	@22.50
pine, 200 lb. gr. wt.	bbl.	6.00 @	6.50
Pigmentar, tank cars.	gal.	.16 @	—
in drums	gal.	.22½ @	.23½
R. S. L. Resin	lb.	— @	—
Retort Pine Tar, drums.	ton	20.00	@26.00
Solvents			
Acetone, pure	lb.	.07 @	.09
Benzene, 90%, tank car.	gal.	.14 @	—
Beta-Trichlorethane	gal.	— @	.20
Bondogen	lb.	.98 @	1.25
Carbon, bisulfide	lb.	.05 @	.08½
Carbon tetrachloride	gal.	.66½ @	1.17
Dichlorethylene	lb.	— @	—
Dipentene, cml., drums.	gal.	.38 @	.50
Ethylene dichloride	lb.	.07½ @	.08
Plastogen	gal.	.07¾ @	.12
Reogen (drums)	lb.	.11½ @	.23
Rub-Sol	gal.	.09½ @	—
Trichlorethylene	lb.	— @	.08½
Turpentine, spirits	gal.	.48½ @	.52½
dest. dist., drums.	gal.	.30 @	.36
Waxes			
Beeswax, white	lb.	.41 @	.45
Carnauba, yellow	lb.	.72 @	.75
Ceresin, white, dom.	lb.	.11 @	.15½
Montan, crude	lb.	— @	—
Paraffin			
Yellow crude scale, 124/126	lb.	.05 @	—
Refined, 123/125	lb.	.05¾ @	—

ANTI-OXIDANTS

Agerite Alba	lb.	2.00 @	2.15
Exel	lb.	1.00 @	1.02
Gel	lb.	.57 @	.59
Hipar	lb.	.65 @	.67
Powder	lb.	.52 @	.54
Resin	lb.	.52 @	.54
Resin D	lb.	.52 @	.54
White	lb.	1.25 @	1.60
Albasan	lb.	.70 @	.75
Antox	lb.	— @	.56
B-L-E	lb.	.52 @	.61
Flectol B	lb.	.52 @	.65
Flectol H	lb.	.52 @	.65
Flectol White	lb.	.90 @	1.15
Neozone A, B, C, D, E	lb.	.52 @	.63
Oxynone	lb.	.77 @	.90
Retardex	lb.	.45 @	.48
Santoflex B	lb.	.52 @	.65
Santovar A	lb.	1.15 @	1.40
S.C.R.	lb.	.33 @	.35
Stabilite	lb.	.52 @	.54
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.52 @	.61

MOLD LUBRICANTS

Aresklene	lb.	.35 @	.50
Cocoa Soapstock	lb.	.06 @	.08
Dipex	lb.	.06 @	.08
Lubrex	lb.	.25 @	.30
Mineralite	ton	—	@30.00
Mold Paste	lb.	.12 @	.18
Rubberol	lb.	.13½ @	.14
Sericite	ton	65.00	@75.00
Soap Tree Bark, cut, sifted	lb.	.06 @	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.25 @	—
Amberex Type B	lb.	.18¾ @	—
Black	lb.	.08 @	.12
White	lb.	.08½ @	.13½
Brown	lb.	.08 @	.11½
Neophax A	lb.	.119 @	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 2	lb.	.07½ @	.15
Sulfur Chloride, yellow (drs.)	lb.	.035 @	.04
Sulfur, rubber makers			
Refined (bags)	cwt.	2.85 @	—
Commercial (bags)	cwt.	2.00 @	—
Telloy	lb.	1.75 @	—
Vandex	lb.	1.75 @	—

STATISTICS

Crude Rubber — Latex & Guayule — Reclaim — Tires & Tubes — Automobiles — Rims — Gasoline — Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1924	325,899	173,367,272	23.75	10,309	6,057,63/	26.23	315,590
1925	393,370	426,167,504	48.36	14,827	19,847,753	59.76	378,543
1926	409,944	501,131,064	54.57	17,671	22,470,583	56.77	392,273
1927	424,733	338,688,492	35.60	27,775	24,735,488	39.76	396,958
1928	432,633	242,727,423	25.05	32,159	18,128,761	25.17	400,474
1929	560,082	239,177,811	19.06	36,485	16,868,718	20.64	523,597
1930	482,083	139,133,048	12.88	30,205	9,310,205	13.76	451,878
1931	497,176	72,922,845	6.55	25,595	4,255,572	7.42	471,581
1932	409,556	31,936,459	3.48	20,930	2,015,612	4.30	388,626
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	387,280
1934	449,513	97,929,676	9.73	23,848	5,770,109	10.80	425,665
1935	453,134	115,299,448	11.36	11,389	3,084,331	12.09	441,745
1936	467,064	152,072,496	14.54	12,581	4,488,223	15.93	454,483
1937	574,600	237,307,041	18.44	7,902	3,385,433	19.02	566,698
1938	397,620	125,357,730	14.07	5,652	1,799,124	14.21	391,968
1939	469,803	167,558,245	15.92	13,125	5,832,618	19.84	456,678
1940	780,820	303,117,726	17.33	7,060	3,197,136	20.22	773,760
1940:							
May	47,559	18,511,955	17.38	821	301,914	16.41	46,738
June	51,074	20,019,581	17.50	623	295,334	21.15	50,451
July	66,931	26,426,632	17.63	100	49,828	22.20	66,831
Aug.	70,453	27,608,883	17.49	416	183,369	19.69	70,037
Sept.	75,770	29,317,340	17.27	666	349,443	23.43	75,104
Oct.	73,179	27,975,598	17.07	316	123,216	17.38	72,863
Nov.	69,844	26,917,136	17.21	126	52,020	18.45	69,718
Dec.	94,172	36,369,973	17.24	205	94,422	20.52	93,967
1941:							
Jan.	84,201	33,370,482	17.69	292	138,009	21.11	83,909
Feb.	70,745	28,469,753	17.97	327	144,139	19.69	70,418
Mar.	84,991	34,030,846	17.88	329	163,375	22.19	84,662
Apr.	61,288	24,193,639	17.62	238	99,371	18.96	61,054
May	98,438	39,537,574	17.93	370	204,865	24.72	98,068

Note: "Gross Imports" do not include latex or guayule. To secure more accurate figures for "Net Imports" latex and guayule figures (shown below) should be added and the re-export figure deducted from the total. Annual figures for 1924-36 were revised in February, 1937.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule Tons	Guayule Dollars	Balata Tons	Balata Dollars	Jelutong Tons	Jelutong Dollars	Liquid Latex (1) Tons	Liquid Latex (1) Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,272	3,537,510
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,394	4,686,743
1927	5,018	2,674,957	582	477,246	7,785	2,448,657	1,495	1,170,650
1928	3,077	1,755,685	731	430,855	7,552	2,540,05y	4,007	2,121,786
1929	1,275	545,175	728	566,964	8,204	2,458,126	3,729	1,788,391
1930	1,096	347,388	502	422,684	5,907	1,403,244	4,458	1,508,786
1931	....	.....	1,207	411,380	5,777	1,019,010	4,675	888,909
1932	....	.....	707	147,403	4,607	616,596	5,112	601,999
1933	...	.....	1,659	2,261,869	5,990	944,895	11,085	1,833,671
1934	398	75,349	1,054	438,209	4,987	943,752	13,107	3,643,221
1935	459	86,835	615	188,384	5,644	1,063,126	13,553	3,782,222
1936	1,229	286,552	535	199,368	6,163	1,296,364	19,852	6,659,899
1937	2,694	745,873	354	151,344	7,109	2,017,786	23,185	10,213,670
1938	2,485	623,819	509	181,140	9,132	2,944,504	11,878	4,147,318
1939	2,232	463,345	694	265,553	6,640	1,603,418	27,438	10,467,552
1940	3,634	758,007	648	300,500	7,451	2,449,137	33,789	14,593,466
1940:								
May	289	57,578	60	20,503	495	158,713	3,584	1,523,879
June	365	74,957	47	10,977	390	146,196	2,451	1,004,007
July	262	53,038	65	20,553	336	115,599	2,281	993,411
Aug.	297	59,464	61	22,638	701	276,642	2,278	1,022,531
Sept.	250	49,845	40	19,245	712	246,641	2,953	1,337,437
Oct.	381	77,286	70	38,092	1,150	382,168	1,156	512,153
Nov.	392	78,587	67	43,939	445	152,297	2,308	1,169,086
Dec.	278	62,586	54	39,471	1,102	341,876	3,534	1,539,957
1941:								
Jan.	447	104,128	57	32,910	698	221,911	2,184	1,019,741
Feb.	283	65,942	41	22,790	768	245,732	2,946	1,279,648
Mar.	426	98,187	36	16,147	715	258,514	1,707	774,225
Apr.	423	95,916	64	18,533	514	189,520	1,594	648,217
May	334	76,414	61	44,381	822	287,249	2,632	1,117,226

(1) Weight given in pounds of dry rubber contained in latex.
Note: Annual figures for 1924-1936 revised on basis of information received on February 8, 1937.

U. S. Consumption of Crude Rubber

(Including Latex)

	Figures on Monthly Basis: 1934	1935	1936	1937	1938	1939	1940	1941
Jan.	39,190	46,636	48,631	50,879	31,265	47,387	58,061	65,989
Feb.	40,515	42,720	36,841	51,950	25,357	43,422	52,078	62,692
Mar.	47,003	42,153	42,813	54,129	32,389	51,416	52,454	69,024
Apr.	44,853	44,247	52,031	51,859	29,730	45,268	52,361	71,374
May	42,918	41,101	50,612	51,795	30,753	45,484	54,513	71,365
June	40,147	36,156	52,772	51,860	32,540	48,438	47,834	84,912
July	32,553	35,917	48,250	43,703	34,219	44,975	48,354	
Aug.	33,216	38,775	46,777	41,506	40,552	51,740	53,307	
Sept.	30,258	37,086	46,449	43,945	40,183	51,402	52,469	
Oct.	31,253	41,969	49,637	38,754	42,850	57,155	59,644	
Nov.	34,748	42,310	50,433	34,025	49,050	55,677	57,716	
Dec.	36,569	42,474	49,754	29,195	48,143	49,636	59,709	
Tot.	453,223	491,544	575,000	543,600	437,031	592,000	648,500	

Note: The above figures are based on the annual surveys conducted by the Leather and Rubber Division, Bureau of Foreign & Domestic Commerce, Washington, D. C., with the exception of those for the current year which are estimates made by the Rubber Manufacturers Association. They are revised frequently and the latest available issue should always be consulted for the most reliable figures.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks	Year	Production	Consumption Tons	Consumption % to Crude	Stocks
1931	129,690	123,000	35.1	21,714	1936	150,571	141,486	24.6	19,000
1932	75,656	77,500	23.3	16,334	1937	185,033	162,000	29.8	28,800
1933	93,587	85,000	21.2	17,780	1938	122,400	120,800	29.9	23,000
1934	108,162	100,855	22.3	20,000	1939	186,000	170,000	28.7	25,250
1935	122,948	117,523	23.9	17,000	1940	208,971	190,244	29.3	32,636

	Figures on Monthly Basis: Production	Consumption Tons	Consumption % to Crude	Stocks		Production	Consumption Tons	Consumption % to Crude	Stocks
1940:									
Jan.	19,239	16,341	28.1	27,089	July	14,299	14,539	30.1	27,129
Feb.	17,938	15,629	30.0	27,962	Aug.	17,161	14,464	27.1	28,526
Mar.	17,182	16,200	30.9	27,524	Sept.	16,379	14,835	28.3	29,039
Apr.	16,518	16,573	31.7	26,492	Oct.	19,300	16,807	28.2	30,816
May	17,499	15,984	29.3	27,141	Nov.	17,636	16,312	28.3	31,459
June	16,581	15,163	31.7	27,701	Dec.	19,239	17,397	29.1	32,636
1941:									
Jan.	20,413	19,086	28.9	33,380	July	.....	.....	...	.....
Feb.	19,506	18,222	29.1	33,654	Aug.	.....	.....	...	.....
Mar.	22,006	19,611	28.4	35,028	Sept.	.....	.....	...	.....
Apr.	21,574	20,427	28.6	35,336	Oct.	.....	.....	...	.....
May	22,775	21,405	30.0	35,871	Nov.	.....	.....	...	.....
June	23,790	22,559	26.6	36,265	Dec.	.....	.....	...	.....

Note: The above figures are based on the annual surveys conducted by the Leather and Rubber Division, Bureau of Foreign & Domestic Commerce, Washington, D. C., with the exception of those for the current year which are estimates made by the Rubber Manufacturers Association. They are revised frequently and the latest available issue should always be consulted for the most reliable figures. The annual figures are more accurate. Stocks shown are those on hand at the end of the indicated month or year.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)
(In Thousands of Barrels of 42 Gallons)

	1939*	1940	1941		1939*	1940	1941
January	38,089	40,370	45,344	August	54,025	55,346	.....
February	34,928	37,557	42,253	September	49,505	52,297	.....
March	43,042	44,607	48,606	October	49,854	53,807	.....
April	44,264	47,683	55,105	November	47,407	49,074	.....
May	49,766	52,946	59,107	December	43,807	46,413	.....
June	50,133	55,459	.....				
July	50,689	53,865	.....	Total	555,509	589,424	.....

* Revised.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1929	24,141,502	1933	8,713,962	1937	22,257,564
1930	17,364,096	1934	12,255,118	1938	10,612,138
1931	11,253,800	1935	18,664,107	1939	17,471,914
1932	6,261,336	1936	20,790,192	1940	19,378,558

1941		1941		1941	
January ...	2,032,121	May	2,407,864	September .	.....
February ..	2,131,211	June	2,308,986	October ...	.....
March	2,665,961	July	2,061,144	November .	.....
April	2,682,225	August	.....	December ..	....

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave
1939																																
May	15⅛	15⅜	16	15⅛	16	16	—	16	16⅞	16⅞	16⅞	16⅛	16⅛	16⅞	15⅝	16⅞	16⅞	16	—	16	—	16⅞	16⅞	16¾	16⅝	16⅞	16⅞	—	16⅝	—	16⅝	16⅛
June	16⅛	16⅜	—	—	16⅜	16⅜	16⅜	—	16⅜	16⅜	16⅜	16⅜	16⅜	16⅞	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	—	16⅜
July	16⅞	—	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	—	16⅜
August	16⅞	16⅞	16⅜	16⅜	—	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	—	16⅜
September	19⅜	18⅜	—	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	—	16⅜
October	20	18⅜	19⅜	19⅜	24	21½	19⅝	20	19	22	19⅝	23	22¾	19⅝	22	22	20⅜	20⅜	21¾	21½	22	22	21¾	21¾	20⅝	20⅜	20	20	19¾	20	20⅛	21¼
November	20⅜	20⅛	20⅜	20⅜	19⅝	20⅛	—	20⅜	—	—	20⅜	—	20⅜	20⅜	20⅜	20⅜	—	20½	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20	20⅜	19⅞
December	20	—	20⅜	19⅞	19⅞	19⅜	19⅜	19⅜	—	20⅞	20⅜	20⅜	20⅜	20⅜	20⅜	20	20⅜	20	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20½	19⅜	19⅜	19⅜	20	—	20
1940																																
January	19⅜	19⅜	19⅜	19⅜	19⅞	—	—	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅞	19⅜	19⅜	19⅜	19⅜	19	—	19⅞	18⅞	18⅞	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	19
February	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	19⅜	18⅜	18⅜	18⅞	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜
March	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜
April	18⅞	18⅜	18⅜	18⅜	18⅞	18⅞	18⅞	18⅞	19	18⅞	18⅞	18⅞	18⅜	19⅜	19	19⅜	19⅞	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
May	19⅜	19⅜	20	20⅜	21⅜	21⅜	21⅜	20⅜	21⅜	24	23½	23½	23⅜	24	23½	23⅜	22⅜	22⅜	22⅜	21⅜	21	21	21	21	21	21	21	21	21	21	21	21
June	22	21⅜	20	21⅜	21⅜	21⅜	21⅜	21⅜	20⅜	24	22½	22⅜	22⅜	22½	22½	22⅜	22⅜	22⅜	22⅜	22⅜	23	23	23	23	23	23	23	23	23	23	23	23
July	21⅜	21⅜	21⅜	20½	20½	20½	20½	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20½	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜
August	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜
September	—	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜
October	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	20⅛	20⅛	21⅛	21⅛	21⅛	21⅛	21⅛	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜
November	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜
December	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜
1941																																
January	20⅞	—	20½	20½	—	20½	20⅜	20⅜	20⅜	20⅜	20⅞	—	—	20½	20	20½	20⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅞	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜
February	—	—	19⅞	19⅞	19⅜	19⅜	19⅜	19⅜	19⅜	20	22	—	—	20½	20½	19⅜	19⅜	18⅞	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜
March	20⅜	20⅛	20⅜	20⅜	21⅜	21⅜	21⅜	21½	22	21⅝	22⅜	22⅜	22⅜	22⅜	22⅜	23	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜
April	22⅞	22⅞	22⅞	22⅞	22⅜	22⅜	22⅜	22	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜
May	24	23⅝	24⅛	24⅛	24⅜	24⅜	24⅜	24	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜
June	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝	23⅝
July	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜
August	23	—	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Markets)

Average Price per Pound for Years 1913-1932

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1914	65.33	1918	60.15	1922	17.50	1926	48.50	1930	11.98
1915	65.85	1919	48.70	1923	29.45	1927	37.72	1931	6.17
1916	72.50	1920	36.30	1924	26.20	1928	22.48	1932	3.49
1917	72.23	1921	16.36	1925	72.46	1929	20.59	1933	5.96

Average Monthly Price per Pound Since 1933

	1934 Cents	1935 Cents	1936 Cents	1937 Cents	1938 Cents	1939 Cents	1940 Cents	1941 Cents
Jan.	9.32	13.10	14.35	21.37	14.63	15.75	19.06	19.88
Feb.	10.45	12.92	15.48	21.33	14.71	15.93	18.83	20.43
Mar.	11.01	11.51	15.89	24.09	13.55	16.26	18.58	22.17
Apr.	12.10	11.55	15.98	23.44	11.84	15.87	19.16	22.74
May	13.26	12.05	15.62	21.14	11.57	16.07	21.21	23.90
June	13.51	12.57	15.85	19.29	12.57	16.37	22.20	21.88
July	14.60	12.10	16.49	18.86	15.37	16.51	21.12	22.19
Aug.	15.47	11.98	16.25	18.37	16.08	16.67	19.62	
Sept.	15.36	11.55	16.46	18.55	16.15	21.24	19.28	
Oct.	13.96	12.62	16.55	16.28	16.89	19.89	20.33	
Nov.	13.04	13.15	17.97	14.60	16.24	20.21	21.04	
Dec.	12.98	13.28	20.01	15.41	16.05	20.01	20.76	
Average for Year	12.92	12.37	16.41	19.39	14.64	17.57	20.10	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	1941 May	1941 June	1941 July	1941 Aug.	Day	1941 May	1941 June	1941 July	1941 Aug.
1	14	—	—	—	16	14 1/16	—	—	—
2	14	—	—	—	17	—	—	—	—
3	—	13 7/16	—	—	18	—	—	—	—
4	—	13½	—	—	19	14	—	—	—
5	—	13⅝	—	—	20	13⅞	—	—	—
6	—	13⅝	—	—	21	13⅞	—	—	—
7	—	—	—	—	22	13⅞	—	—	—
8	—	—	—	—	23	13½	—	—	—
9	—	—	—	—	24	—	—	—	—
10	—	—	—	—	25	—	—	—	—
11	—	—	—	—	26	13⅝	—	—	—
12	—	—	—	—	27	13⅝	—	—	—
13	—	—	—	—	28	13⅞	—	—	—
14	—	—	—	—	29	13⅝	—	—	—
15	14	—	—	—	30	13⅝	—	—	—
					31	—	—	—	—

Average Monthly Price Per Pound

Month	1938 Pence	1939 Pence	1940 Pence	1941 Pence	Month	1938 Pence	1939 Pence	1940 Pence	1941 Pence
Jan.	7.077	7.926	11.793	12.415	Aug.	7.841	8.545	12.818	
Feb.	7.029	7.942	12.577	12.769	Sept.	7.918	9.634	11.964	
Mar.	6.590	8.120	11.651	13.967	Oct.	8.355	10.177	11.813	
Apr.	5.793	7.910	10.980	14.228	Nov.	8.111	11.210	11.801	
May	5.632	8.002	11.600	13.670	Dec.	8.005	11.559	11.963	
June	6.147	8.216	13.046	—	Average for Year.	7.164	8.959	12.035	
July	7.464	8.271	12.410	—					

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	1941 June	1941 July	1941 Aug.	Date	1941 June	1941 July	1941 Aug.	Date	1941 June	1941 July	1941 Aug.
1	—	15.43	16.88	11	14.46	16.00	16.76	22	—	17.41	
2	13.58	15.43	17.60	12	14.37	16.18	16.35	23	15.50	17.01	
3	13.77	15.40	—	13	14.57	—		24	15.35	17.28	
4	13.78	—	17.47	14	14.63	16.35		25	15.30	17.70	
5	13.74	15.45	17.24	15	—	16.58		26	15.53	17.91	
6	13.84	—	17.33	16	14.69	16.35		27	15.80	—	
7	14.01	15.77	17.30	17	14.95	16.32		28	15.33	17.87	
8	—	15.92	17.21	18	14.79	16.46		29	—	17.64	
9	14.05	16.02	16.97	19	14.92	16.97		30	15.24	17.08	
10	14.21	15.94	—	20	15.03	—		31	—	16.75	
				21	15.13	17.26					

Average Monthly Price Per Pound

	1938 Cents	1939 Cents	1940 Cents	1941 Cents		1938 Cents	1939 Cents	1940 Cents	1941 Cents
Jan.	8.57	8.94	11.19	10.66	Aug.	8.41	9.30	9.84	
Feb.	8.91	8.97	11.10	10.87	Sept.	8.17	9.30	9.69	
Mar.	8.92	9.00	10.90	11.08	Oct.	8.61	9.24	9.62	
Apr.	8.76	8.87	10.89	11.48	Nov.	9.08	9.73	9.97	
May	8.50	9.56	10.33	12.97	Dec.	8.72	10.97	10.18	
June	8.38	9.88	10.72	14.66	Average for Year	8.66	9.46	10.40	
July	8.85	9.71	10.42	16.55					

Stocks of Crude Rubber

(All figures are in long tons)

ON HAND OR AFLOAT TO THE U. S.

End of	ON HAND 1939	1940	1941	AFLOAT 1939	1940	1941	TOTAL 1939	1940	1941
Jan.	220,727	139,304	309,411	48,210	90,285	153,169	268,937	229,589	462,580
Feb.	207,882	129,023	320,372	55,814	112,257	136,955	263,696	241,280	457,327
Mar.	201,752	134,871	338,147	55,981	113,619	140,228	257,733	248,490	478,375
Apr.	188,074	152,645	329,767	57,918	102,557	153,484	245,992	255,202	483,251
May	187,980	148,881	359,234	54,046	109,364	147,459	242,026	258,245	506,693
June	173,493	154,313	339,108	51,274	119,138	175,499	224,767	273,451	514,607
July	165,450	175,455		52,990	139,629		218,440	315,084	
Aug.	152,029	194,760		66,717	141,286		218,746	336,046	
Sept.	136,824	220,597		68,310	137,888		205,134	358,485	
Oct.	119,404	235,353		100,500	166,837		219,904	402,190	
Nov.	105,205	250,412		114,044	158,095		219,249	408,507	
Dec.	125,800	288,864		91,095	145,950		216,895	434,814	

Note: Above figures include stocks held by United States Government.

STOCKS OUTSIDE REGULATED AREAS

(Figures from the International Rubber Regulation Committee)

1940	Singapore and Penang	Para and Manaos	United Kingdom	United States	Total
June	32,375	1,706	25,000*	168,235	227,316
July	36,716	1,667	25,000*	190,222	253,605
August	40,395	1,580	25,000*	212,774	279,749
September	29,069	2,559	25,000*	241,538	298,166
October	33,613	3,084	30,000*	259,140	325,837
November	33,778	3,697	30,000*	276,943	344,418
December	26,773	2,165	35,000*	318,486	382,424
1941					
January	37,145	2,151	40,000*	309,411	388,707
February	46,913	2,510	40,000*	320,372	409,795
March	41,005	1,200	40,000*	338,147	420,352
April	42,085	2,205	40,000*	329,767	414,057
May	44,610	1,768	40,000*	359,234	445,612

* Estimated.

STOCKS INSIDE REGULATED AREAS

(Figures from the International Rubber Regulation Committee)

1940	Malaya	N.E.I.[1]	Ceylon [1]	Other *	Total
June	45,618	42,665	10,426	4,205	102,914
July	43,850	37,387	9,433	4,529	95,199
August	39,950	38,251	9,771	4,256	92,228
September	44,730	39,614	9,384	4,124	97,852
October	42,239	37,720	9,158	4,407	93,524
November	43,693	39,267	11,675	3,997	98,632
December	48,787	48,622	11,850	4,124	113,383
1941					
January	47,198	45,137	13,196	4,329	109,860
February	55,512	48,390	14,677	4,064	122,743
March	44,432	46,492	.....	4,210	.....
April	53,237	46,755	.....	4,009	.....
May	46,511	.....	.....	3,772	.....

(1) Estates and Dealers. (*) Estimated.

RUBBER STOCKS AFLOAT

End of: 1940	Afloat for United States	Afloat for Europe	All Other Afloat	Total Afloat
June	119,138	50,000	65,862	235,000
July	139,629	55,000	55,371	250,000
August	141,286	55,000	53,714	255,000
September	137,033	60,000	67,967	265,000
October	166,837	60,000	38,163	265,000
November	158,095	60,000	31,905	250,000
December	145,950	60,000	44,050	250,000
End of: 1941				
January	153,169	60,000	51,831	265,000
February	136,955	60,000	48,045	245,000
March	140,228	60,000	59,772	260,000
April	153,484	60,000	.....	.....
May	147,459	60,000	.....	.....
June	175,499	.....	.....	.....

Note: *Total Afloat* figures are estimated at 1½ months' world shipments by the International Rubber Regulation Committee. *Afloat for U. S.* is supplied by the Rubber Manufacturers Association. *Afloat for Europe* is estimated. *All Other Afloat* is determined by subtraction.

TOTAL WORLD STOCKS

At End of:	1936	1937	1938	1939	1940	1941
January	600,479	454,249	549,762	497,665	433,841	721,575
February	599,355	445,265	565,833	479,578	429,551	730,294
March	583,318	447,856	586,666	460,723	447,472	743,231
April	567,172	428,249	586,291	438,252	465,345	755,334
May	541,871	413,134	568,158	429,979	470,981	.....
June	520,255	434,250	573,136	407,640	500,774	.....
July	519,074	445,782	580,654	418,639	547,708	.....
August	500,520	457,462	565,394	397,345	579,119	.....
September	493,585	470,768	551,447	396,867	631,888	.....
October	486,159	479,398	540,976	413,274	651,775	.....
November	466,491	493,266	512,196	395,217	659,308	.....
December	466,576	545,533	482,852	391,125	702,089	.....
Monthly Avge..	528,738	460,022	555,280	427,192	543,321	.....

Note: Figures prior to 1941 represent principal world stocks only, as supplied by the Department of Commerce. Figures since 1941 represent total world stocks, as compiled by the Commodity Exchange, Inc.

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Production Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	13,437	13,355	11,376	15,565	7,314	13,946	14,896	16,333
Apr.-June	13,565	12,597	14,892	15,834	7,380	13,759	15,636	18,259
July-Sept.	9,822	11,312	14,914	12,207	10,794	15,182	13,877	
Oct.-Dec.	10,406	12,099	14,858	9,704	12,360	14,726	14,777	
Total	47,230	49,363	56,040	53,310	37,848	57,613	59,186	

Shipment Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	10,730	11,154	10,554	14,143	7,388	12,445	12,791	15,263
Apr.-June	14,998	13,473	15,940	15,741	9,564	15,107	17,595	21,447
July-Sept.	11,648	13,489	14,037	13,106	11,243	15,791	12,904	
Oct.-Dec.	9,310	12,066	12,855	10,495	12,098	14,165	15,484	
Total	46,686	50,182	53,386	53,485	40,293	57,508	58,774	

Inventory Figures [2]

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	11,651	11,675	8,762	12,004	10,547	9,963	10,789	10,149
Apr.-June	10,219	10,755	7,556	12,081	8,337	8,632	8,871	7,079
July-Sept.	8,419	8,288	8,690	11,200	7,859	8,080	9,837	
Oct.-Dec.	9,455	8,196	10,717	10,383	8,166	8,665	9,127	

Figures for Recent Months

	PRODUCTION 1939	1940	1941	SHIPMENTS 1939	1940	1941	INVENTORY [2] 1939	1940	1941
Apr.	4,310	5,092	5,823	4,458	5,037	6,050	9,813	10,867	9,958
May	4,473	5,413	6,073	4,800	5,755	7,733	9,540	10,523	8,373
June	4,976	5,131	6,363	5,849	6,803	7,664	8,632	8,871	7,079

AUTOMOBILE INNER TUBES

Production Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	12,823	12,553	11,891	15,831	7,314	12,383	12,801	15,349
Apr.-June	13,191	11,631	14,624	15,413	7,380	11,847	13,703	17,631
July-Sept.	10,321	11,270	15,320	12,038	10,794	13,118	12,425	
Oct.-Dec.	9,891	12,425	15,201	9,092	12,360	13,300	13,308	
Total	46,226	47,879	57,036	52,374	37,848	50,648	52,237	

Shipment Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	10,640	11,252	11,367	14,606	7,387	11,422	11,683	14,265
Apr.-June	14,553	11,928	15,113	15,495	9,564	13,010	14,978	18,617
July-Sept.	11,545	13,251	15,069	12,901	11,243	13,449	11,344	
Oct.-Dec.	8,306	11,636	12,874	9,765	12,099	13,309	14,209	
Total	45,044	48,067	54,423	52,767	40,293	51,190	52,214	

Inventory Figures [2]

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	10,244	10,406	8,660	11,993	10,547	8,752	8,110	8,143
Apr.-June	8,795	10,050	8,075	11,833	8,337	7,549	6,848	7,054
July-Sept.	7,639	7,565	8,595	11,326	7,859	7,206	7,970	
Oct.-Dec.	9,180	8,231	10,945	10,312	8,166	7,036	7,017	

Figures for Recent Months

	PRODUCTION 1939	1940	1941	SHIPMENTS 1939	1940	1941	INVENTORY [2] 1939	1940	1941
Apr.	3,852	4,615	5,496	3,940	4,547	5,371	8,653	8,191	8,143
May	3,746	4,737	5,855	4,034	4,745	6,324	8,373	8,206	7,686
June	4,249	4,351	6,280	5,036	5,686	6,922	7,549	6,849	7,054

[1] These figures are based on reports received from the Rubber Manufacturers Association. They are revised frequently and the latest available issue should be consulted for most reliable figures.

[2] Stocks held by manufacturers at end of period indicated.

Automobile Production

Year	United States Total	Passenger Cars	Trucks	Canada Total	Passenger Cars	Trucks	Grand Total
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934	2,753,111	2,177,919	575,192	116,852	92,647	24,205	2,869,963
1935	3,946,934	3,252,244	694,690	172,877	135,562	37,315	4,119,811
1936	4,454,115	3,669,528	784,587	162,159	128,369	33,790	4,616,274
1937	4,808,974	3,915,889	893,085	207,463	153,046	54,417	5,016,437
1938	2,489,085	2,000,985	488,100	166,086	123,761	42,325	2,655,171
1939*	3,577,292	2,866,796	710,496	155,426	108,369	47,057	3,732,718
1940	4,469,354	3,692,328	777,026	222,984	110,126	112,858	4,692,338
1940							
Oct.	493,223	421,214	72,009	21,151	7,056	14,095	514,374
Nov.	487,352	407,091	80,261	23,621	10,814	12,807	510,973
Dec.	483,567	396,531	87,036	23,364	11,653	11,711	506,931
1941							
Jan.*	500,863	411,233	89,630	23,195	11,990	11,205	524,058
Feb.*	485,616	394,513	91,103	23,710	10,647	13,063	509,326
Mar.*	507,805	410,196	97,609	26,044	12,093	13,951	533,849
Apr.*	462,270	374,979	87,291	27,584	12,091	15,493	489,854
May	518,748	417,698	101,050	26,585	9,840	16,745	545,333
June	520,521	418,983	101,538	25,753	8,538	17,215	546,274

* Revised.

Note: U. S. figures represent factory sales; Canadian, production.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA							NETHERLAND INDIES							
	Gross Exports	Imports	Net Exports	Ceylon	India & Burma	Sarawak	British North Borneo	Thailand	Java & Madura	Sumatra E. Coast	Other N.I.	Indo-China	Amazon Valley	All Other	World Total
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,536
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	3,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,932	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,312
1934	677,361	211,803	465,558	79,746	10,492	17,233	11,103	17,545	87,400	112,058	175,470	20,170	8,903	2,985	1,008,663
1935	590,319	174,652	415,667	54,316	13,968	19,465	8,885	28,327	57,488	78,325	139,297	28,816	11,275	8,745	864,574
1936	520,286	167,799	352,487	49,692	14,724	21,243	8,177	33,702	61,307	84,577	152,205	40,782	14,193	11,466	845,431
1937	681,638	213,446	468,192	70,353	17,015	25,922	13,213	5,551	84,085	139,632	207,863	43,399	15,576	13,063	1,133,864
1938	526,911	156,101	370,810	49,528	15,178	17,792	9,512	41,080	57,526	94,501	145,909	58,518	14,618	12,920	887,892
1939	553,324	177,851	375,473	61,026	15,881	24,014	11,864	41,266	72,786	117,791	181,272	65,140	13,892	22,224	1,002,629

	British Malaya [1]	N.E.I.	Ceylon [2]	India & Burma [2]	North Borneo	Sarawak	Thailand	Indo-China	Oceania	Africa [3]	Liberia	South America	Mexico (Guayule)	Grand Total
1940	540,417	537,733	88,937	23,317	17,623	35,166	43,940	64,437	2,300	9,903	7,223	17,601	4,007	1,392,604
1940:														
April	25,454	44,416	4,144	1,807	1,799	2,951	1,834	2,927	203	720	598	1,159	317	88,329
May	57,874	40,436	7,337	2,018	1,370	2,696	2,582	4,578	195	961	364	2,305	331	123,047
June	45,471	44,834	5,603	1,553	1,421	4,077	2,178	2,730	168	727	405	1,080	101	110,348
July	42,861	60,482	7,330	1,194	1,767	2,494	4,253	4,045	169	800	342	1,035	443	127,215
Aug.	45,872	45,078	8,139	1,332	1,593	2,640	4,545	7,337	285	800	308	1,233	327	120,729
Sept.	58,892	44,009	9,985	1,319	1,743	2,404	3,247	9,303	100	800	323	1,295	200	133,715
Oct.	52,767	50,139	8,127	1,841	1,693	2,564	3,355	2,082	200	800	600	1,860	200	126,228
Nov.	36,045	37,387	5,623	2,626	1,130	3,360	3,463	6,715	200	800	600	1,500	200	99,649
Dec.	56,263	35,325	10,700	3,405	1,028	3,520	5,343	9,000	200	600	813	1,427	392	128,216
1941:														
Jan.	37,804	58,593	7,858	955	2,085	2,445	2,137	9,058	333	800	750	2,103	448	125,369
Feb.	27,115	42,091	4,346	1,022	1,686	2,922	4,137	1,995	200	800	828	1,814	282	89,238
Mar.	56,651	53,233	6,074	1,285	1,154	3,726	5,712	6,286	200	800	958	2,835	250	139,164
Apr.	41,206	48,915	6,991	1,164	2,175	3,118	4,271	3,000	250	800	750	2,009	250	114,899
May	53,062	48,029	7,786	1,019	1,237	3,849	1,841	3,500	200	800	750	1,080	250	123,403

(1) Including Brunei and Labuan; figures shown represent rubber which has actually been shipped and include rubber from the free stocks in Singapore and Penang. (2) Exports of domestic produce. (3) Exclusive of Liberia. Notes: Figures shown prior to 1940 were furnished by the United States Department of Commerce. Figures since 1940 were furnished by the International Rubber Regulation Committee, which accounts for the difference in the principal producing countries shown. Many figures for current months are provisional only and are later revised when more definite statistics are available. Therefore, it is suggested that figures from the most recent issue should be taken as more reliable.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	73	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	2,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,773	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,296	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,321	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,273	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934	439,172	158,482	49,560	59,330	28,439	69,905	21,398	47,271	9,642	9,115	3,758	12,418	6,900	10,999	926,389
1935	455,758	128,829	51,450	62,899	26,870	57,567	21,880	37,372	9,978	7,593	4,068	11,878	8,140	11,245	895,727
1936	475,359	—2,591	57,032	71,794	27,871	61,223	16,534	30,967	14,109	9,648	2,888	11,236	6,668	8,772	791,510
1937	592,394	92,707	59,871	98,170	36,088	62,311	24,733	30,462	19,164	14,970	4,343	4,680	2,400	13,063	1,055,356
1938	406,343	133,079	59,660	90,200	25,696	45,836	28,170	25,650	11,944	11,309	5,092	16,034	2,400	9,936	871,349
1939	486,348				31,615	42,352			15,426	9,612	7,051				
1940	811,564														
1939:															
Sept.	36,197	4,466	4,000*	....	2,639	9,254	1,500*	2,000*	875	108	222	1,200*	200*	...	62,601
Oct.	39,735	8,530	5,000*	....	5,787	2,749	1,500*	2,000*	1,235	519	653	1,200*	200*	...	69,108
Nov.	41,478	10,500*	5,000*	....	1,709	5,104	1,500*	2,000*	1,200*	667	613	1,200*	200*	...	71,171
Dec.	70,302	5,200*	5,000*	....	3,025	3,961	1,500*	2,000*	1,200*	1,035	1,827	1,200*	200*	...	96,450
1940:															
Jan.	71,565	450	5,000*	....	5,047	4,540	1,500*	2,000*	1,921	891	682	1,200*	200*	....	....
Feb.	41,797	7,500	5,000*	....	3,508	5,241	1,500*	2,000*	1,846	694	495	1,200*	200*	....	....
Mar.	58,302	14,200	5,000*	....	3,062	6,057	1,500*	2,000*	1,784	....	627	1,200*	200*	....	....
Apr.	70,135	16,400	5,000*	....	3,096	2,000*	1,500*	2,000*	1,612	....	....	1,200*	200*	....	....
May	50,610	10,000	5,000*	....	3,108	2,500*	1,500*	2,000*	2,128	....	....	1,200*	200*	....	....
June	53,266	9,500	5,000*	....	1,062	3,000*	1,500*	2,000*	1,181	....	....	1,200*	200*	....	....
July	69,496	19,500	5,000*	....	5,112	3,000*	1,500*	2,000*	1,902	....	....	1,200*	200*	....	....
Aug.	72,612	21,250	5,000*	....	4,605	4,500*	1,500*	2,000*	2,508	....	....	1,200*	200*	....	....
Sept.	78,306	25,940	5,000*	....	2,743	....	1,500*	2,000*	2,485	....	....	1,200*	200*	....	....
Oct.	74,400	.....	5,000*	....	3,336	....	1,500*	2,000*	590	....	....	1,200*	200*	....	....
Nov.	72,775	.....	5,000*	....	5,451	....	1,500*	2,000*	1,366	....	....	1,200*	200*	....	....
Dec.	97,794	.....	5,000*	....	7,437	....	1,500*	2,000*	721	....	....	1,200*	200*	....	....
1941:															
Jan.	86,541	.....	5,000*	....	6,290	....	1,500*	2,000*	1,065	....	....	1,200*	200*	....	....
Feb.	73,647	.....	5,000*	....	3,770	....	1,500*	2,000*	1,717	....	....	1,200*	200*	....	....
Mar.	86,794	.....	5,000*	....	3,879	....	1,500*	2,000*	3,486	....	....	1,200*	200*	....	....
Apr.	63,071	.....	5,000*	....	2,531	....	1,500*	2,000*	2,326	....	....	1,200*	200*	....	....

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1]—United States imports of guayule are included in this compilation. *—Figure is provisional; final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

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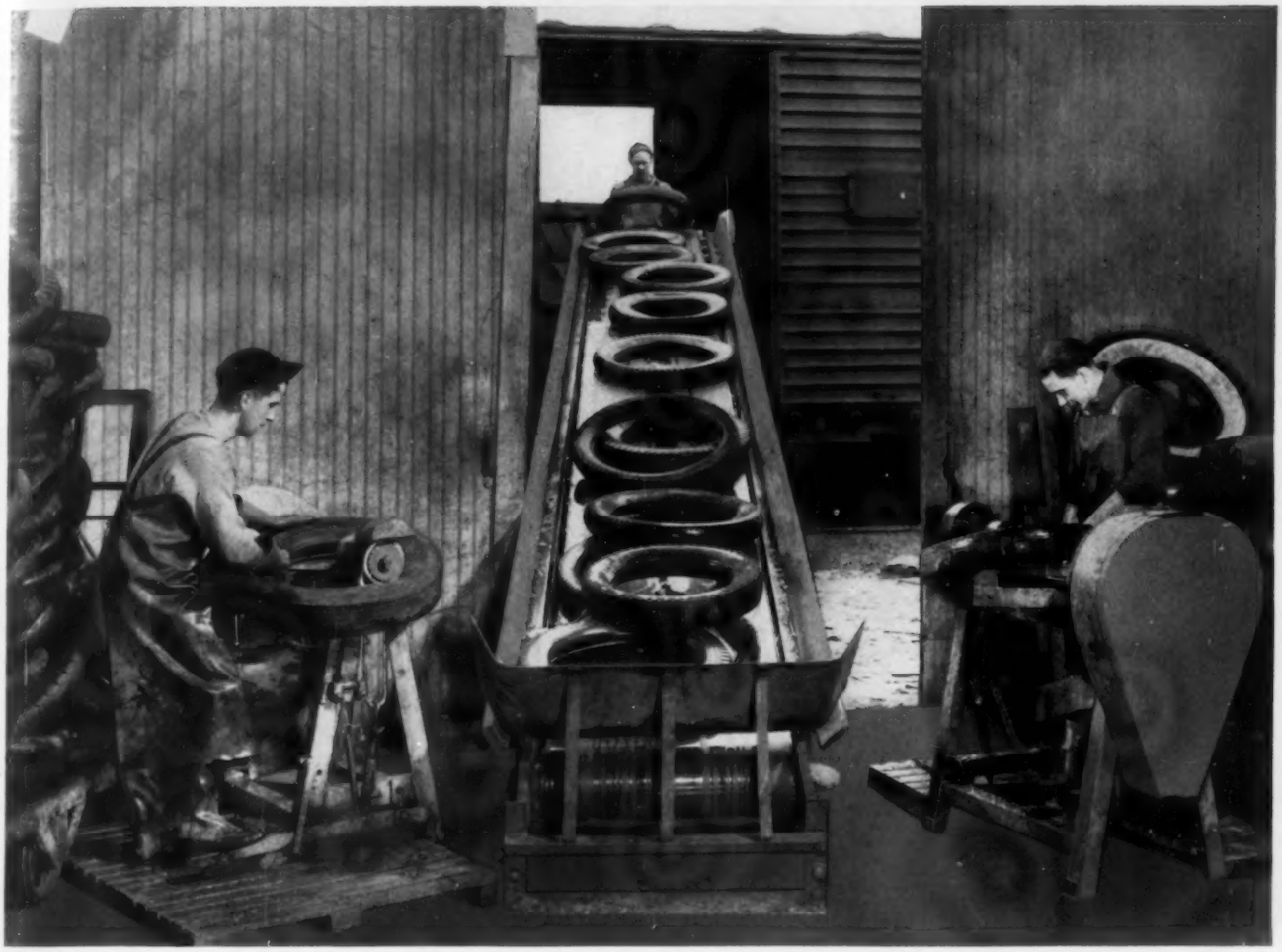

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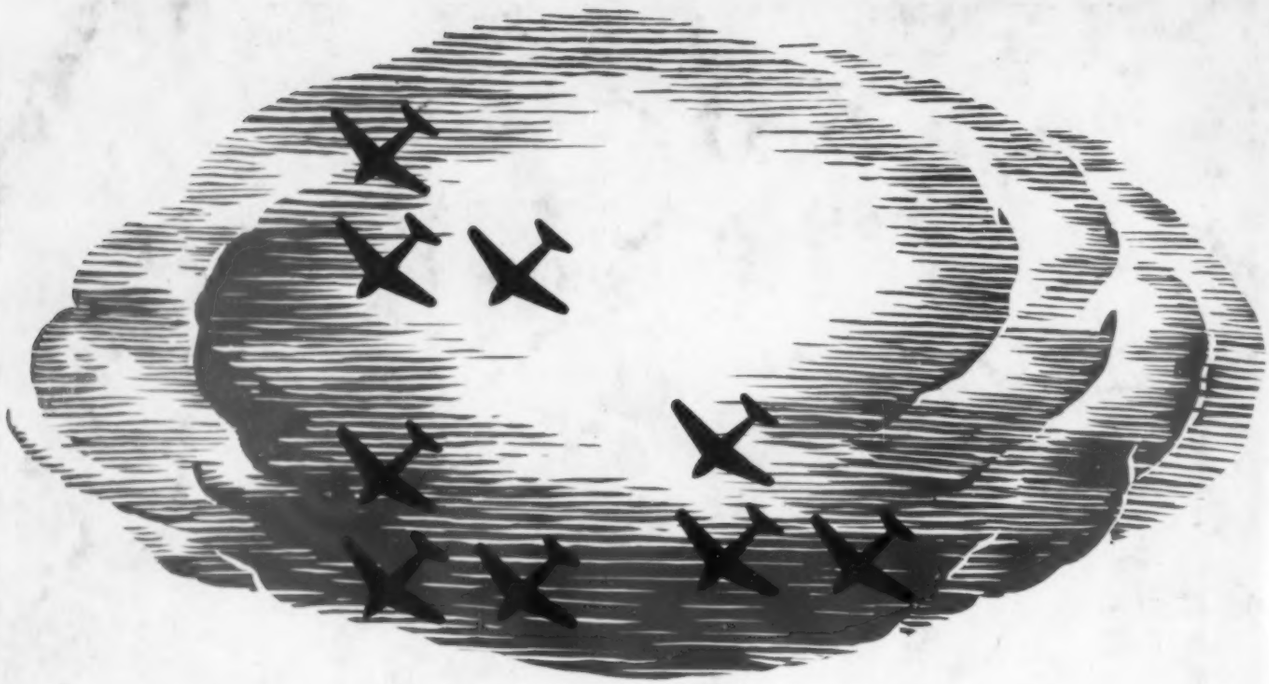

WHEN TEAMWORK COUNTS

It is in abnormal times like these, when abnormal demands are made on raw materials, that we feel most deeply our responsibility to our customers who have made possible the phenomenal growth of this company during the past 13 years. Although our production facilities are today taxed to the utmost we are maintaining our plants at the highest possible efficiency and we expect *with your continued cooperation* to be able to supply your requirements for GASTEX and PELLETEX.

We know that, under the circumstances, we can count on your patience in case unavoidable delays in deliveries are encountered. If restrictions on the use of rubber are necessitating changes in your compounds, we shall be glad to work with you in developing satisfactory formulations.

Thank you! Earl J. Wright

GENERAL MANAGER

GENERAL ATLAS CARBON DIVISION

OF GENERAL PROPERTIES COMPANY, INC.

GASTEX TRADE MARK

SIXTY WALL STREET, NEW YORK, N. Y.

Plants: Pampa, Tex.; Guymon, Okla.

PELLETEX TRADE MARK

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